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A SURVEY OF AIR POLLUTION LITIGATION IN THE PHILADELPHIA AREA

Duke University

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National Air Pollution Control Administration

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Division of Economic Effects Research
Under Contract CPA-22-69-112

"A Survey of Air Pollution Litigation in the Philadelphia Area"

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TABLE OF CONTENTS

		Page
I.	Introduction	1
	A. Scope of the Project	1
	B. Origin of the Project	1
	C. Summary of Results	3
	D. Organization of the Report	3
	E. Personnel Conducting the Study	4
II.	Legal and Economic Damages	4
	A. Legal Damages	5
	B. "Double-counting"	7
	C. "Consumer Surplus"	8
	D. Attorneys' fees; punitive damages	11
	E. Conclusion	12
III.	Methodology and Results	14
	A. Usual sources	14
	B. The search for unreported cases	15
	C. Research on cases identified	17
	D. Survey results	17
IV.	Evaluation	18
	A. Reasons for the Paucity of Cases	18
	B. Appraisal of Cases and Data	22
	C. Analysis of the Elk Paper Case	26
V.	Proposal	28

APPENDICES

Appendix A - Case description: Pottock v. Continental Can Co.	33
Appendix B - Case description: King Farms Co. v. United States Steel Corp.	37
Appendix C - Case description: Weber v. Rosen	38
Appendix D - Case description: Heck v. Beryllium Corp.	39
Appendix E - Decision of the court, Phillips v. Elk Paper Mfg. Co. and data concerning damages	44

LIST OF EXHIBITS (bound separately)

A - (re Pottock v. Continental Can Co.)
1 - AISI Sampler data and charts showing daily fluctuations.
2 - Decision of the court, April 3, 1967

D - (re Heck v. Beryllium Corp.)
1 - air quality data
2 - complaint in Wentzel v. Beryllium Corp.

I. Introduction

A. Scope of the Project

The contractor undertook a study of recent private air pollution litigation in the area of Philadelphia, Pennsylvania,[1] for the purpose of generating information useful to the government in estimating the economic effects of air pollution. The object was to prepare a report describing particular cases in appropriate detail and incorporating the raw data found, together with the researchers' evaluation. An important purpose of the project was to evaluate the technique of such a litigation survey as a means of obtaining such information and to provide an estimate of the feasibility of future studies of this type and recommendations concerning the approaches most likely to prove fruitful in eliciting the kind of data sought. Further indications of the scope of the project appear in the Statement of Work section of the contract.

The use to which the project's findings would be put were largely undetermined at the outset, as the project was of an experimental character and intended to determine the utility of the information discovered. Ideally, the data discovered would permit the extrapolation from specific damage findings to estimates of gross damage in a particular community or could at least be used to confirm the validity of estimates arrived at by other means. Failing discovery of data that could be put to such uses, the project might still be useful in giving an impression of the extent to which private litigation has been employed to rectify pollution damage and to provide case-by-case illustrations of particular instances in which pollution has become a problem. Other benefits that might be expected from a project of this kind would include indications of the variety of pollution effects and the state of public concern over the problem, some sense about the history of the development of the law of air pollution, a basis for conclusions concerning the role that can be assigned to private nuisance and trespass actions in abatement programs, and possible insights into the market effects of pollution and into the efficiency of the market mechanism.

B. Origin of the Project

The project originated in discussions initiated by personnel of the Division of Economic Effects Research with Professor Mayerhurst. It appeared that NAPCA personnel were concerned primarily with establishing by experimental means the feasibility of an approach employing techniques similar to those

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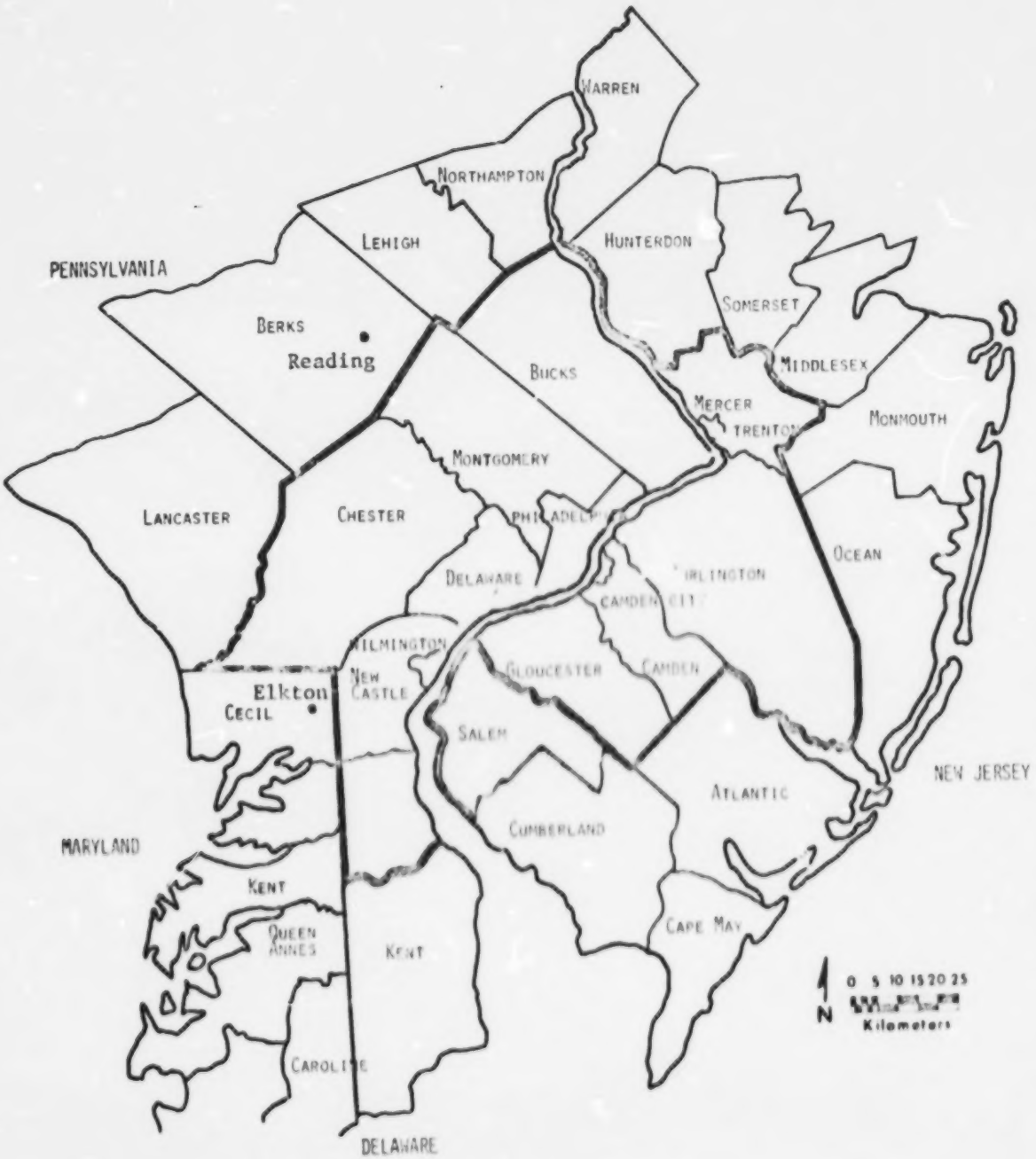
[1] The area was selected by NAPCA in the hope that the results would tie in with other research being undertaken in the Philadelphia region. The precise boundaries of the region studied coincide with those of the Air Quality Control Region designated by NAPCA. The region includes four counties in Pennsylvania, four counties in New Jersey, and one county in Delaware. The accompanying map (p. 2) delineates this area and indicates in addition the locations of Reading, Pennsylvania, and Elkton, Maryland, where other cases dealt with in the report originated.


WARREN
NORTHAMPTON
LEHIGH
HUNTERDON
PENNSYLVANIA
SOMERSET
BERKS
Reading
BUCKS
MIDDLESEX
MERCER
TRENTON
MONMOUTH
MONTGOMERY
LANCASTER
CHESTER
OCEAN
DELAWARE
CAMDEN
WILMINGTON
NEW CASTLE
GLOUCESTER
CAMDEN
Elkton
CECIL
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ATLANTIC
CUMBERLAND
MARYLAND
KENT
QUEEN ANNES
KENT
CAPE MAY
CAROLINE
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Kilometers

ultimately utilized in the study. Numerous practical difficulties were anticipated, and the project was undertaken by the contractor without representations concerning the quantity or the usefulness of the data to be collected.

C. Summary of Results

The study has yielded a number of interesting case histories, which are reported in the Appendix. However, the number of cases discovered was surprisingly small, and it is unlikely that the material collected will be of use in estimating total effects from air pollution or in verifying estimates arrived at by other means. The report and the material discovered may be useful in educating economists and others to the functioning of the law in this field, and the cases may yield useful illustrations of various matters of interest to economists. Whether any of the more ambitious and hopeful purposes set forth above can be deemed to have been achieved is doubtful.

The more productive portion of the study may in fact lie in the effort made to understand the relationship between legal and economic damages and to conceive of a manner in which legal damages could be made to serve a function for economists. Part II of the report sets forth an analysis of how damages awarded in private litigation should be regarded by economists, whose concerns are different from those of a court in a private lawsuit. A reading of this discussion may be of considerable use to economists who may not fully appreciate how the law and economics differ in their approach to damages. The analysis is exceedingly complex, but some judgments are finally made as to how legal damages should be regarded for economic purposes. Because of the complexity of the questions faced, we prefer to regard these conclusions as tentative and subject to further development by an economist. We believe, however, that we have isolated a number of interesting and relevant considerations.

The concluding section of the report outlines very briefly how a more useful type of project focusing on damage awards in private litigation might conceivably be undertaken. The purpose of such a project would be to obtain data that could be compared in a large number of cases for the purpose of establishing some rough relationship between air quality--concentrations of particular pollutants--and effects on property values. Unquestionably, the technical and practical problems connected with developing such a project would be considerable, and perhaps the utility of the result would not warrant undertaking it. Nevertheless, we have regarded our function as one of exploring all of the possible means of using private damage awards as a guide to the extent of pollution damage generally. If the proposal is rejected, we would think that the possibilities of making use of this source of data and of authoritative damage measurement will have been laid to rest. In this somewhat negative sense, we believe that we have accomplished the main purpose of the contract.

D. Organization of the Report

The next section undertakes to spell out in theoretical terms the relationship between damages awarded in private litigation and the economic damages that concern an economist. The following section sets out the methodology of the survey, evaluating the techniques used and attempting to explain the difficulties that were encountered.

Section IV of the report appraises the data obtained in terms of its quantity, completeness, clarity, form, and comparability. The last section sets forth a brief proposal as to how economic effects might conceivably be extrapolated from data that might be obtained in connection with private litigation if a major effort were to be made for that purpose.

Finally, the appendices set forth each case that was investigated in such detail as seemed appropriate or was available from the sources contacted.

E. Personnel Conducting the Study

The project director, Professor Clark C. Havighurst of the Duke University School of Law, supervised the performance of the contract. He has an interest in air pollution problems and has edited a 230-page symposium entitled "Air Pollution Control," which appeared in the quarterly Law and Contemporary Problems published by the Duke Law School. He is currently a member of the National Air Pollution Manpower Development Advisory Committee, which advises NAPCA on training programs and other matters, and of the adjunct faculty of the Office of Manpower Development of NAPCA at Research Triangle Park, North Carolina. He participates in a number of committees concerned with the formation and operation of the Triangle Universities Consortium on Air Pollution, involving the three universities in the Research Triangle area of North Carolina.

Mr. John Dillow, currently a second-year student at Duke University School of Law, did the basic research in Philadelphia and has participated in the drafting of this report. Mr. Dillow is a high-ranking student and is trained as a sanitary engineer. He has had a number of courses in the engineering aspects of air pollution. He has an emerging interest in the legal aspects of air pollution and is currently engaged in writing an article on some legal problems in this field for the Duke Law Journal.

The project officer, Mr. Brian Peckham of the Division of Economic Effects Research, has consulted periodically with the project director and Mr. Dillow and has supplied much useful guidance on the economics of air pollution.

II. Legal and Economic Damages

The study is concerned in part with using "legal" damages for the purpose of making or confirming estimates of economic damage for use in connection with a cost-benefit analysis of air pollution control efforts. Thus, some thought must be given to whether the damages that are recognized as compensable in private litigation are a useful enough index of the economic benefits of pollution abatement to be used in a cost-benefit study. It is, of course, quite possible that material discrepancies in measurement techniques, occasioned by the widely divergent purposes of the respective inquiries, could invalidate or weaken the

conclusions that might be drawn. This discussion first develops the legal principles for determining damages in private nuisance litigation and then draws some tentative conclusions concerning the economic relevance of the harms legally found. It should be made clear—as it will become apparent—that our economic sophistication may not be fully adequate to this latter task. We believe we have raised the relevant issues, however.

A. Legal Damages 1/

Legal (i.e., compensable) damages from air pollution may include harm to both persons and property. Property damage can be direct (e.g., measured by the costs of repair or maintenance) or indirect (e.g., measured by the effect of the reduced air quality on the property's market value). Harm to persons may be either general (e.g., widespread annoyance at an odor) or individual (e.g., actual sickness afflicting one among many exposed). Compensation is ordinarily payable for both kinds of harm where a pollution source is found to be a nuisance, a conclusion that requires a judgment that a particular use of property imposes "unreasonable" and "substantial" costs on neighboring property. "Reasonableness" can be a function of many factors, some of which an economist would be unlikely to agree with. 2/ Thus, a court might easily conclude that a particular pollution source was not, under all the circumstances, a nuisance without necessarily determining that no losses were imposed on neighboring land.

1/ The following brief statement of the law of nuisance damages appears in Greer v. Lennox, 107 N.W.2d 337, 339 (N. Dak. 1961), which involved odors and other harms caused by an improperly operated city dump:

> To create liability for a private nuisance it must cause substantial harm. In other words it must substantially and unreasonably invade or interfere with another's use and enjoyment of his property. When the nuisance is temporary the ordinary measure of damages is the loss of rental or use value of the premises for the duration of the nuisance. When permanent, it is the permanent diminution in value of the property. In addition, "the value of any personal discomfort or inconvenience which the plaintiff has suffered, or of any injury to health or other personal injury sustained by the plaintiff, or by members of his family so far as they affect his own enjoyment of the premises, as well as any reasonable expenses which he has incurred on account of the nuisance." Prosser, Torts (2d Ed.), p. 417; Parsons v. Sioux Falls, 65 S.D. 145, 272 N.W. 283 (1937). When damages are sought for personal annoyance, discomfort, or inconvenience, it is not measured by the annoyance, discomfort or inconvenience of a particular plaintiff but the standard is whether such interference would offend, discomfort, or annoy the normal person of ordinary taste and sensibilities in the community.

2/ In general, the courts undertake a balancing of the gravity of the harm done against the utility of the activity causing the harm. Restatement of Torts § 826 (1939). Economic theory would, of course, dictate the imposition of all costs on the activity in order that the market might then determine its utility. See also id. §§ 827-31.

By the same token, in some cases an injunction against a nuisance condition might be obtained without damages being sought or awarded, presumably for reasons connected with either the difficulty of proof or actual inconsequentiality. Because failure of a court to award, or of a plaintiff to seek, damages tells little or nothing about the presence or absence of economic harm, we do not consider cases where no damages are awarded to be useful for the purposes of a study of this kind.

Nuisances may be either temporary or permanent. If the court for legal reasons determines not to enjoin a particular continuing land use which is nevertheless a nuisance, or if the plaintiff does not seek an injunction, the nuisance thereby becomes permanent, entitling adjoining landowners to damages measured by the reduction in their property's market value with an additional recovery generally being permitted for discomfort and annoyance.3/ This raises the conceptual problem of whether future discomfort is also compensable in either the present or a subsequent lawsuit or whether the judgment in the first action constitutes, in effect, the purchase by the defendant of a perpetual right to pollute at the original rate without any further obligation to compensate those who inhabit the affected property. The courts' reaction to this problem has favored a single action with allowance for prospective damages.4/ In the case of certain temporary nuisances, however, each isolated recurrence--as, for example, a sporadically malfunctioning boiler--gives rise to a new cause of action, and successive actions are allowed in doubtful cases.5/ A nuisance which is temporary, either in nature or in the sense that the court sees fit to enjoin its continuance, raises fewer problems; the harm is generally measured by the lost use value during the life of the nuisance and personal discomfiture during this time.6/

Measuring damages by the decline in market value attributed to a nuisance raises some questions; these questions are of particular interest here because economists would usually be inclined to accept market values as a suitable guide,

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3/ The courts allow recovery for annoyance and discomfort by imposing the standard of a person of "ordinary sensibilities." Thus, the plaintiff's own particular sensibilities are not in issue. Restatement of Torts § 822, comment g (1939); see also note 1 supra.

4/ McCormick, Damages § 127 (1935); Oleck, Damages to Persons and Property § 213 (looseleaf 1961); see also Restatement of Torts § 930 (1939). The states vary in their positions on this point, and these differences should be taken into account in any study. Pennsylvania and Delaware follow the majority rule.

5/ 39 Am. Jur. Nuisances § 130 (1942); 66 C.J.S. Nuisances § 140 (1950); Annot., 12 A.L.R.2d 1231 (1950).

6/ Annot., 142 A.L.R. 1309 (1943).

especially since this is usually the most easily ascertained datum. Although a piece of property's value as a residence might be greatly diminished by air pollution, its market value might not fall significantly if it were highly desirable for an industrial use. The law appears to guard against the resulting undervaluation of damages by permitting "lost value of use" (sometimes called "loss of enjoyment") as an alternative measure of damages.7/ A residential lessee would thus be entitled to recover the lost market value of his lease, and a resident landowner could recover lost use value for some limited period, where market value alone did not appear to be a fair measure. The economic analyst would also probably entertain this alternative measure of damages as a suitable means of taking account of the loss of enjoyment suffered by those who were temporarily deprived of the property's use or who continued to use the property as a residence after its suitability for that purpose was reduced.8/ Thus, even if the plaintiffs had disposed of their property without a loss, some damages would seem appropriately recognized, and the courts would appear to be providing a useful service to the economist in attaching a value to the loss of enjoyment.

B. "Double-counting"

A major problem for our purposes is whether there is an overlap between personal harm and effects on property values so that there is a danger of "double-counting" if both are deemed compensable. In other words, if a plaintiff recovers the amount by which the market or use value of his property is reduced by pollution and is also allowed damages for the personal discomforts and annoyances of living under pollution conditions, is he receiving double compensation for the same harm? The case law gives some attention to this possibility, and the general rule appears to be that a recovery for annoyance and discomfort is permitted in addition to recovery for any adverse effect on the market value of property.9/ The award for annoyance and discomfort is not, however, based on the

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7/ " There is recognition . . . . given to the fact that the existence of a permanent nuisance may cause injury by destroying or diminishing the value of the use of property and not cause loss in the market value of the property." Annot., 10 A.L.R.2d 669 (1950). See Restatement of Torts § 929 (1939), which indicates that both actual loss of use and loss of market value are compensable in the same action to the extent they do not overlap.

8/ The economist would consider such damages for only a limited period, as eventually the use of the land could be expected to change. The amount recognized would be a sort of dislocation expense.

9/ Annot., 142 A.L.R. 1316 (1943); 39 Am. Jur. Nuisances §§ 130 (1942). See Millett v. Minnesota Crushed Stone Co., 145 Minn. 474, 177 N.W. 641 (1920), motion for rehearing denied, 145 Minn. 480, 179 N.W. 682 (1920), which discounts the "double-counting" problem under these circumstances, and Southern Ry. Co. v. South, 161 Ky. 196, 170 S.W. 520 (1914), which emphasizes the double recovery problem. See also Phillips v. Elk Paper Mfg. Co., No. 1577-B (Cir. Ct. Cecil Cty., Md., 1969), in Appendix E.

The double-counting risk would seem especially great where the court concerned itself with lost use value or lost enjoyment rather than with reduction

effects on the plaintiff personally but is determined with reference to the annoyance and discomfort likely to be suffered by a person of ordinary sensibilities.10/

An economist would wish for a more careful analysis of the double-counting possibility than the courts have provided. While property values will reflect some of the personal effects of air pollution, there are often serious information problems that would prevent the market from making accurate adjustments. For example, the market might be expected to reflect the true economic effect of harmless but unpleasant odors but not of more insidious pollutants and to evaluate immediate effects, such as annoyance and discomfort, more accurately than the effect of long-term exposure. Thus, where damages are awarded for specific injury to one or a few individuals out of many exposed, there is some basis for concluding that the market was incapable of accurately gauging the risk of harm and discounting market values accordingly; compensation in excess of lost market value would therefore seem more clearly appropriate than in a case involving only odors.11/ Thus, one test to be applied in determining the possible existence of double-counting is whether the pollution hazard was of a sort that the market could effectively evaluate. If the market would be capable of discounting the pollution condition fully, then a further inquiry is needed to see if the additional damages awarded for discomfort and annoyance should be ignored in determining economic damages. This question involves consideration of what we have labeled "consumer surplus."

C. "Consumer Surplus"

Even if no informational deficiency existed, so that the market would be capable of discounting fully the economic consequences of a pollution condition, additional annoyance and discomfort damages might still be cognizable by the economist. For example, in a given case, an apparent double recovery might be explained on the basis that the court believed the plaintiff's true loss

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in market value. Technically, the court should concern itself with the market value of use--e.g., the value of a lease--rather than the user's personal utility, but this will commonly not be done. Where the distinction is not preserved--the court counting loss of (personal) enjoyment as well as annoyance and discomfort--there would seem to be a clear case of double-counting. It nevertheless remains possible that in assigning dollar amounts to the various items of damage the court will have sensed the various considerations with sufficient accuracy that its total award will retain utility for the economist. Such a case would require the exercise of judgment.

10/ See note 3 supra.

11/ A personal injury action is thus maintainable in addition to an action for the nuisance. The annoyance and discomfort award in a nuisance action is not based on individual susceptibility. See note 3 supra.

exceeded that represented by the decline in market value or lost use value of the property. Such a belief would be justified where the plaintiff appeared to have special personal losses flowing from such things as a sentimental attachment to the property, special locational advantages, and other subjective considerations. Courts might be warranted in making some upward adjustments in damage figures to reflect the loss of value flowing from such considerations in a particular case.

We have given the name "consumer surplus" to the phenomenon encountered here, and the question for consideration is whether and how consumer surplus that is reduced or eliminated by air pollution should be counted in determining economic harm. "Consumer surplus" here means the excess utility value of property to its owner over its market value, and it originates in market imperfections, including transaction costs, which prevent the market value of each parcel from approaching the top limit of the buyer's willingness to pay.12/ Of course, pollution might or might not reduce or eliminate consumer surplus, depending upon the owner's indifference map, and it would usually be impossible to determine from objective facts either the existence of consumer surplus or its reduction as the result of a pollution condition. However, if the property owner were to sell the affected property as a result of the pollution condition, we could conclude that any consumer surplus that did exist must necessarily have been destroyed, since if the owner continued to value the property above the market he would not have sold it. Still, measurement of the extent of the loss would be practically impossible. By the same token, a property owner who does not sell his property may also have suffered a significant loss of consumer surplus in excess of the reduction in the property's market value.

Whether lost consumer surplus should be compensated by the courts is perhaps an open question. Because consumer surplus is itself in a sense a windfall, restitution for its loss might not seem essential to a fair outcome. Moreover, proving the existence and loss of consumer surplus is extremely difficult and would depend largely on the plaintiff's own self-serving testimony. Economists have long since discovered that consumer surplus is not a matter on which the consumer's testimony has any probative value,13/ and perhaps the courts have sensed the same thing and elected a method of damage assessment which does not explicitly encompass lost consumer surplus but which allows the factfinder sufficient latitude that bonus damages for such a loss may often be awarded. Lawyers can therefore be tolerant of double-counting of damages by the courts where there is grounds for suspecting that the annoyance item of damages was a surrogate for the loss of consumer surplus and that what appeared to be a

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12/ This usage of the economic term "consumer surplus" may not be entirely accurate, but the phenomenon sought to be described is at least analogous to that in price theory where, under a single-price system, some consumers benefit by paying less for a good than they would willingly have paid. Because the real estate market is only imperfectly competitive, consumer surplus may sometimes be quite large. However, it will not always be adversely affected by a pollution condition. Nevertheless, it would seem better, if possible to avoid ignoring its existence altogether, as is often done in cost-benefit analysis.

13/ E.g., Samuelson, "The Pure Theory of Public Expenditure," 36 Rev. Econ. & Stat. 387, 388-89 (1954).

duplication was in fact the law's method of accounting for a loss that could not adequately be measured if it were explicitly made an item of damages.

The question we have had to face is whether in determining economic damages it is appropriate to leave in the final figure an amount that we believe represents an adjustment by the court or jury in recognition of lost consumer surplus. We first explored the possibility that air pollution's effects on consumer surplus would balance out over the entire economy, on the thought that pollution could increase consumer surplus as readily as it could decrease it. We believed for a while that the potential for increasing consumer surplus was shown by the case of the landowner who, having no sense of smell, continued to value his land the same after the introduction of odors that depress the market price; but if such persons existed in any numbers the marketplace would probably include other persons who could similarly ignore the odors, and market price might therefore not be affected at all. The proper conclusion seems to be that air pollution will have a net adverse effect on consumer surplus because the annoyance and discomfort from a new pollution source among the persons caught within its ambit will exceed that among a population that the market would select to live under pollution conditions. Neither market value nor lost use value seems sufficient to take these dislocation effects into account.14/

For the foregoing reasons we believe that economists should be interested in lost consumer surplus, and we have therefore not adopted a strict attitude toward the double-counting possibility. While the law, like economics, is handicapped in the identification and measurement of lost consumer surplus, we believe that the fairest approximation of economic damages can be arrived at by not taking too harsh a view of what may appear conceptually to be double-counting. We would therefore argue against shaking out the apparently duplicative damages if the facts indicate that a significant loss of consumer surplus has occurred.

One possible objection must be dealt with. We could expect that the cases reaching litigation would be the ones most likely to involve substantial elements of consumer surplus, as this excess valuation by the plaintiff of his damaged property would provide a strong motivation for litigating the matter in the first place and would inhibit settlements. This possible bias in the sample in turn raises some doubt about the validity of extrapolating damage awards in these cases for the purpose of estimating pollution damage generally. Nevertheless, annoyance and discomfort awards will not compensate a hypersensitive landowner in full because the judge or jury is to be guided by the standard of a person of ordinary sensibilities.15/ There would be some basis, then, for assuming that this award will tend to reflect the excess of (1) market value--which, as noted above, is determined by those bidders who are less pollution-sensitive and will therefore value the property higher--over (2) utility to an average man. This would seem to be precisely the consumer

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14/ See note 16 infra and accompanying text.

15/ See note 3 supra.

surplus that the economist would like to isolate.16/

Of course, to the extent that the judge or jury indulges in a sympathy award based on the plaintiff's unique circumstances, the possibility does exist of excessive double-counting induced by the presence of atypical amounts of consumer surplus. Still, we believe that this danger is offset by another tendency of the law--namely that introduced by the burden of proof. The burden of proof placed on the plaintiff will often result in a compromise valuation figure or in the denial of an item that from an economic view should probably have been counted, with the result that damages may be undervalued. While these countervailing tendencies--toward sympathy for plaintiffs on the one hand and toward compromise and inadequacy on the other--point up the inexactness of the courts as a measuring device, we believe that an averaging of their judgments would possess enough economic validity, together with a legitimacy in the eyes of the public, that a real benefit might be derived from systematically collecting the results of damage suits for the purpose of establishing the economic harms flowing from air pollution.

D. Attorneys' fees; punitive damages

Seemingly duplicative damages may mask other considerations, besides consumer surplus, which are arguably valid in the litigation context but which may not be factors that an economist would wish to take into account for his purposes. Thus, one further possible explanation of the law's complacency toward the double-counting possibility may be a general sense that plaintiffs who have been put to the expense of a lawsuit ought not to be held to too close an accounting, especially in a class of cases where awards are not apt to be large in any event. To prevent discouraging such litigation the courts might well choose to support a measure of damages that would yield a fair return to the plaintiff after payment of attorneys' fees and the fees of expert witnesses.

An economist would probably consider the litigation costs part of the total damage--a transaction cost--caused by the pollution occasioning the litigation. For purposes of generalizing about pollution damage by extrapolating from a series of specific instances, however, these expenses should probably be disregarded in the first instance. To obtain a gross damage figure it would seem appropriate to add a figure for the cost of private air pollution litigation, but this item should be separately stated as an indirect cost. If liberality in the award were thought to flow from this general tendency, a rigorous effort to shake double-counting out of the final figure would be justified.

16/ This description of the effect being measured seems the most helpful. It is characterized above as a "dislocation effect." But while an economist might use this figure for assessing damages in a given case, he might worry about using it to generalize as to other situations (where, for example, a source had operated for forty years). Still, there is a community judgment embodied that should perhaps be given effect.

Occasionally, a court might allow a claim for punitive damages.17/ Awards of such damages will be rare, but it should be clear that punitive damages, being expressly noncompensatory, are entirely outside the area of the economist's concern and should therefore not be counted in determining economic damages. Similarly (and as with sympathy awards), if there were a basis for concluding that a court or jury had awarded excessive compensatory damages because of a sense of outrage, the award should be adjusted downward. Special attention to the double-counting possibility is again indicated.

E. Conclusion

The law cannot satisfy the cost-benefit analyst's most cherished wish, namely for data as to the maximum amount owners of property affected by a pollution condition would be willing to pay to eliminate the pollution source. Such a figure, if it were available, would take into account consumer surplus effects as well as market factors (though not the harms, annoyance, and discomfort suffered during the continuance of the condition). However, data of this kind is not obtainable from any source, and therefore legal damages may provide an acceptable substitute.

Legal damages are arrived at in a way that economists would find hard to approve for their purposes. The law's articulation of the allowable items of damage departs quite far from a list of the factors that concern the economist, and the legal theory of damages has serious conceptual flaws. While we think that the law leaves enough room for taking into account all of the things an economist would include in a damage estimate and that the courts' damage awards can be analyzed and adjusted to improve their utility in a cost-benefit study, we still think there is a serious question about the relevance and adaptibility of legal damages to the purposes of the economist interested in quantifying air pollution damage.

This section of the report has set forth the many problems in using legal damages in measuring economic costs and our thoughts on how these problems might be overcome. In our view, a final judgement on whether the accuracy that can be obtained is sufficient for the economist's purposes will require an appraisal of the cost and validity of alternative means of arriving at the same estimates and the desirability of developing several alternative measures for purposes of mutual verification. We would emphasize that judicial damage awards have a certain solemnity about them and therefore a prima facie legitimacy and authority in the public's eyes that economists' usual methods may lack. Believing as we do that there may be substantial value in having authoritative damage valuations that take some account of intangible or immeasurable factors and in a certain sense express the judgements of the community at large on pollution's ill effects, we have sketched a brief proposal in the concluding portion of this report. That proposal outlines how a nationwide effort at collecting and evaluating damage awards could be undertaken to provide a basis for drawing a set of functions relating various pollutant concentrations to property values.

17/ As the name implies, punitive damages are meant to reflect a court's judgment that the defendant's conduct was particularly flagrant. The plaintiff in Weber v. Rosen (see Appendix C) sought punitive damages in addition to several types of compensatory damages.

On the basis of the foregoing discussion we have established the following rules of thumb for use in analyzing the results of individual litigated cases:

(1) Legal damages awarded may be excessive as a result of the general adoption of a measure of damages that permits double-counting, i.e., a sympathy award or simply an unwarranted allowance in excess of the reduction in market value.

(2) To the extent that damage awards reflect true double-counting they should be adjusted downward in arriving at economic damages; suspicion that an excess award was designed to cover attorneys' and witnesses' fees is not a basis for failing to make such a downward adjustment.

(3) A downward adjustment should not be made where apparent double-counting can be explained, in light of the facts, as compensation for either of the following actual losses by the plaintiff which are not expressly accounted for in the items of damage recognized by the courts:

(a) adverse economic effects which because of market imperfections--largely of an informational variety--would not be expected to be adequately reflected in the award of the reduction in market or use value.

(b) lost consumer surplus, which would be indicated, with or without sale of the property, by (i) a demonstrated personal locational advantage, sentimental attachment, or high transaction costs associated with moving, coupled with (ii) a particular personal susceptibility to the pollution condition. If the annoyance and discomfort award is deemed to be compensation for lost consumer surplus it should not be a reflection of actual annoyance and discomfort experienced by the plaintiff but should reflect only that of a person of "ordinary sensibilities."18/

(4) Items of damage that are unique to the particular plaintiff--such as (a) personal injuries or discomfort and annoyance in excess of that experienced by the average person exposed to the pollution condition, or (b) damage to special items of personal property--should be separately identified. While such items would be preperly includible for purposes of determining the economic damage involved in the particular pollution episode, they would not be appropriate for inclusion in any damage figure used to extrapolate general damages or otherwise to generalize from the specific experience.19/

(5) No total damage award, however it may have been itemized by the court, should be reduced below the maximum amount that would have represented a reasonable award, based on the evidence, for items that an economist would wish to have counted. Occasionally an item of damage proved as to nature and amount but disallowed by the court for reasons deemed irrelevant to the economist's purposes might be added back to the final total, though care must be

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18/ See note 16 supra on the appropriateness of counting lost consumer surplus in generalizing from the particular experience.

19/ See the discussion of personal injuries in Part V of the report.

exercised in this regard so as not to upset the authoritativeness of the total study. Finally, each case must be viewed independently on its own facts, and undue credence ought not to be given to the itemization of damages provided by the court.

III. Methodology and Results

The first problem was to locate the cases that would be of interest to us. This was necessarily a difficult problem because we anticipated that many of the cases in which we would be interested would not be reported--that is published, indexed, and readily identifiable and accessible. For one thing, only appellate decisions are reported in most American jurisdictions, leaving all cases in which there was no appeal accessible only through court records. While Pennsylvania probably reports more of its lower court decisions than any other state, it was found that cases originating in Philadelphia County are much less frequently reported than cases elsewhere in the state. Most other counties, including those adjacent to Philadelphia and included in the metropolitan area, maintain county reporter systems of their own and publish at least the most important cases decided at the trial level in the county during the year, but only occasional Philadelphia cases appear in the District and County Reports. Our intention from the beginning was to locate both reported and unreported cases, and we were aware that there is no easy means of finding cases that have not appeared in the reports. Subparts A through C below indicate the research techniques that we employed.

Our initial research was concentrated in Pennsylvania, but as sources in that state were exhausted, we turned attention to those counties of New Jersey and Delaware encompassed in the air pollution control region. Roughly the same research techniques were employed in these areas.

A. Usual sources. The starting point was, of course, the law libraries, where a number of Pennsylvania cases that had reached the appellate stage were discovered. Unfortunately, none of the recent Pennsylvania decisions involving air pollution, of which there is a substantial number, have originated in the Philadelphia metropolitan area. Thus, while this survey was useful in understanding the status of Pennsylvania law, it was of no use in uncovering cases of direct consequence to the study.

Also using the law reports and indexes, we were able to locate some trial court judgments which had not been appealed but which represented important contributions to the substantive law in Pennsylvania. Again, none of these cases originated in Philadelphia County itself, although a few cases in the surrounding area were located. These, however, were earlier than the period with which we were concerned and therefore have not been developed for these purposes.1/ The usual indexes and reports were not exhaustive as to lower court decisions, and it was therefore necessary to consider other methods of locating such decisions.

1/ Stanislaw v. Reading Corrugated Container Corp., 48 Berks 63 (1955); Eisenbrown v. Bowers Battery & Sparkplug Co., 48 Berks 248 (1956), exceptions denied, 49 Berks 172 (1957). Both of these cases arose in Reading, to which the study was subsequently extended. See Part III-D infra.

It was found that the reported cases were accurately indexed under various subject headings, and as to these cases a quick and thorough study of the case law was easily accomplished. The leading Pennsylvania cases on private remedies for air pollution nuisances are cited in the footnote.2/ Pennsylvania law appears to follow the general principles applicable in other jurisdictions. The principles of the law of damages in private nuisance situations and the applicable Pennsylvania precedents are cited in Part II of the report.3/

Library sources were also consulted with respect to New Jersey and Delaware cases. The Pottock case was identified in this fashion

B. The search for unreported cases

The search for unreported cases was carried out in a variety of ways. First, the court records were consulted, but since court clerks maintain no subject-matter index, this search proved unavailing. Similarly, the personal knowledge of the clerks was limited by the sheer volume of the case load. Thus, no cases were found through consulting court records, but the records of several cases discovered by other means proved useful in the study. The record in the Pottock case, for example, included even the exhibits, which are usually returned to the attorneys once the case is closed. Court records often will be less useful than this, however, since a trial transcript is not always prepared and the papers filed in a case may provide no data of consequence. The court records will, of course, always reveal the names of the attorneys involved, who may themselves prove to be a valuable resource.

Upon finding the court records useless as a means of identifying cases, we undertook a major effort to consult with or contact in some manner the judges of the various courts of common pleas in the relevant jurisdictions in Pennsylvania. Later, this effort was broadened to cover the relevant portions of Delaware and New Jersey in order to encompass all of the Philadelphia metropolitan area. These trial court judges were asked to recall any private air pollution cases in their courts in recent years. While the judges were most cooperative, only one new damage case was discovered through these efforts, although a number of cases involving injunctive relief were also discovered. The judges also pointed out some alternative sources of information.

The MAPCA office in the control area, the state air pollution agencies in Pennsylvania, New Jersey, and Delaware, and the county and local air pollution agencies were all contacted. These agencies seemed likely to be aware of private litigation in their respective areas, either because a lawyer with a case in this field might approach the agency for advice and assistance or because of a general awareness of developments connected with air pollution.

2/ Evans v. Moffat, 192 Pa. 204, 160 A.2d 465 (1965); Waschak v. Moffat, 379 Pa. 441, 109 A.2d 310 (1954); Ebur v. Alloy Metal Wire Co., 304 Pa. 177, 155 A. 280 (1931); Vile v. Pennsylvania R. Co., 246 Pa. 35, 91 A. 1049 (1914); Evans v. Reading Chem. & Fertilizing Co., 160 Pa. 209, 28 A. 702 (1894); Robb v. Carnegie Bros. & Co., 145 Pa. 324, 22 A. 649 (1891).

3/ See Part II-A.

These agencies proved to be of little help, however, having never been directly involved in any private litigation. In the cases which we discovered by other means, only private consultants were used as experts, and the data utilized was developed by private means. Of course, the agencies are new, and their involvement in private litigation may increase as their potential contribution is made known. While the Philadelphia air pollution agency did have some information concerning particular cases, that information was of such a general nature that it did not permit us to locate the cases themselves, although they were later found through other means.

The U.S. Department of Agriculture office in Pennsylvania was contacted in order to locate any cases involving agricultural damage, but this inquiry was unsuccessful.

Experts in several different pollution-related fields were contacted in the hope that they might have been consulted in connection with private litigation. In view of the number of people in these fields, the method adopted was somewhat cumbersome and was utilized only after other research failed to produce cases. Engineering consulting firms which did any sort of air pollution systems design which specialized in environmental research, such as the Franklin Institute, were first contacted. Of the few firms that had participated in pollution litigation, several were involved in injunction proceedings where no damages were sought. Others had testified in damage cases that had been discovered by other means, and no new cases were identified in this manner.

Air pollution equipment manufacturers and installers were also contacted. Since Pennsylvania law requires that a polluter's use of his land be "unreasonable" before a nuisance will be found, it is usually necessary to show the availability of abatement equipment, its cost, and its use throughout the industry. It seems, however, that brochures and manufacturers' specifications were used more often than the sales representatives themselves. For this reason these contacts were not productive.

The institutions of higher education in the Philadelphia area were also contacted. As indicated in the Beryllium case, the use of meteorological and air studies divisions of these institutions were approached. The University of Pennsylvania, the most likely source, had no air studies section, and its meteorological section was of little help. Drexel Institute, a more technically oriented university, did provide useful information, which nevertheless tended only to corroborate the results of earlier inquiries.

Chemical analysts, such as those used in the Pottock case, are generally necessary in a pollution case to identify the elements present in the atmosphere and fallout and to match these components to the emission products. An inquiry of experts in these fields succeeded in bringing to light persons connected with all but one of the cases found by other means but did not produce any cases not otherwise identified. Some reluctance to divulge information was encountered among those consultants retained by defendants.

Because of the public interest in air pollution, the two newspapers of general circulation in the Philadelphia area were contacted: the Philadelphia Inquirer and the Evening Bulletin. The Legal Intelligencer, a publication specializing in matters of interest to the local bar, was also consulted. No subject matter index was kept by the Inquirer or the Legal Intelligencer,

making research prohibitive. The Bulletin's index indicated that even known air pollution cases failed to gain publicity, only agency actions or fines being reported.

C. Research on cases identified

Once cases were identified, the court record was consulted for such use as it might have. In each case the lawyers involved were identified and contacted. Such contacts were for the most part limited to the attorneys for the plaintiffs in the expectation that lawyers for the emitters would be much less likely to make data available and to cooperate in the research effort. Plaintiffs' lawyers proved reasonably cooperative and generally permitted their files to be examined, at least where the case was closed and there was no risk of compromising a client's interests.

The value and completeness of the attorneys' files varied greatly from case to case. The earlier cases presented particular problems in this respect since records were less available and recollections dim. Thus, the attorney in the Pottock case had misplaced the file since the trial, but the court record proved an adequate substitute in this instance. For the most part, it seemed that the attorneys' files did often contain useful information in addition to that contained in the trial record. For example, in particular instances, more detailed damage information and more complete pollution and meteorological data were obtained in this manner.

Some reluctance to divulge relevant information was encountered on the part of attorneys whose cases were still in the process of litigation. This situation developed with respect to King Farms Co. v. United States Steel Corp., where the attorney for the plaintiff, King Farms, felt he might jeopardize his client's case to some degree by making information available at this stage. As a result of this situation, information gathered on this case is very sketchy and is limited to the pre-trial record.

D. Survey results

In spite of the extensive research outlined above, no private litigation resulting in a damage award was discovered in Philadelphia proper, and only a small number of cases were found in the surrounding area. The reasons for the paucity of cases are explored in Part IV of the report. It is believed that all possible sources of information that might have led to discovery of cases were pursued and that all significant cases leading to damage awards were in fact discovered. Thus, we believe that the following three cases represent all of the private litigation involving air pollution damages that has occurred in the Philadelphia region in the last ten years:

Pottock v. Continental Can Co. (Delaware) (Appendix A)
King Farms Co. v. United States Steel Corp. (Pennsylvania) (Appendix B)
Weber v. Rosen (New Jersey) (Appendix C)

Each of these cases is described in the indicated appendix. Because only the Pottock case had reached a final judgment after trial, only that case has been treated in extensive detail.

Our confidence that all of the relevant cases have been identified is

based largely on the thoroughness of the research done and the fact that the various avenues of research pursued tended to confirm the results reached by other means. In other words, the same cases were turned up again and again by various research techniques, and there was sufficient double-checking to warrant the conclusion that we missed no significant cases that reached the trial stage.

As it became clear that the number of cases to be studied was much smaller than had been anticipated, a decision was made with the assent of the Project Officer, to expand the coverage of the study to take in some cases that were known to exist in areas adjoining the Philadelphia area. As it became apparent that there would not be enough cases to permit any kind of extrapolation of pollution effects for an entire area, it seemed more important for the study to focus on the feasibility of future studies of this kind and to include a greater variety of cases in order better to indicate ways in which private litigation might play a role in the study of economic effects of pollution. Thus the area of study was expanded to include the area of Reading, Pennsylvania (Berks County), at least for the purpose of dealing with a series of cases involving the Beryllium Company of America.4/ These cases, represented in the appendix by Heck v. Berrylium Corp., concern serious personal injuries attributable to effluents from a Reading facility and are still in progress. Similarly, the Elkton, Maryland, area was encompassed for the purpose of encompassing the case of Phillips v. Elk Paper Mfg. Co., which had previously been identified by the Division of Economic Effects Research. It seemed useful for us to review that case from a legal standpoint and to consider it together with the other cases that we had located. In many ways, the Elk Paper case most strikingly suggests the potentiality for relating litigation damage awards and economic effects. Indeed, this case served as a sort of springboard for the entire project, as we discussed it with the Division of Economic Effects Research and remarked on its possible utility for the purpose of a study of this kind. By the same token, our disapointment with the results of our study flows from our failure to discover a case of equal interest or utility for our purposes.

IV. Evaluation

A. Reasons for the Paucity of Cases

It is indeed remarkable that only three recent cases involving private claims for air pollution damage have been discovered in the Philadelphia area. This result is so surprising to us that we have attempted to offer some hypotheses about why so heavily industrialized a region should yield so little in the way of litigation of this kind.

4/ See also cases cited in note 1, supra which arose in Reading and are mentioned from time to time in the report even though they were not specifically made part of the study.

It is first of all important to note that there are a number of cases in which private parties have sought injunctive relief against a private nuisance but have failed to include in their complaint a claim for damages for past harms flowing from the pollution condition. The following list briefly sets forth the cases of this variety that were encountered, together with a brief indication of their nature:

Kelly v. City of Philadelphia, 382 Pa. 459, 115 A.2d 238 (1955). An action to enjoin erection of incinerator by city. Denied.

Martin v. Elwood Ivins Steel Tube Works, Inc. 73 Monts. 447 (1957). An action by many plaintiffs to enjoin operation of steel tube works because of noise and odors. Denied.

Silvestri v. Metallic Finishers, 74 Monts. 356 (1957). Injunctive relief sought by private party against chemical processes causing extreme odors. Granted.

McCloskey v. O'Neill, 14 D.&C. 411 (C.P. of Phila. Cty. 1958). An action to enjoin operation of neighbor's electric fan due to odors. Denied.

Scholl v. Alderfer, 74 Monts. 346 (1958). Injunctive relief granted against dump.

Steskal v. Operacz, 8 Bucks 191 (1958). Injunctive relief granted against dump.

Colehower v. Wayne Iron Works, 55 Del. 52 (1967). Injunctive relief granted against lumber coating process due to noxious odors.

Bondo Mills Corp. v. North Philadelphia Auto Paint Shop, Inc., No. 66-12728 (C.P. Monts. Cty., Pa. 1968). Injunction against painting establishment granted.

Since our inquiries were not specifically directed to finding injunction cases, there is no assurance that this list includes all such cases, but we believe it includes most of them.

There is no impediment, as far as we can see, to seeking damages in addition to an injunction.1/ We therefore cannot adequately explain why attorneys drafting pleadings for this purpose would not include a damage count in addition to the claim for injunctive relief. While problems of proof might be encountered, it would seem that the plaintiff could offer evidence of annoyance and discomfort, at least where he was a homeowner, without going to a great deal of trouble to obtain expert testimony or other sophisticated evidence. Much of the evidence necessary to obtain an injunction--i.e., proof of the "unreasonableness" of the condition and the substantiality of the costs imposed on the neighboring property--would be equally useful in proving a right to damages. While plaintiffs seeking an injunction are expected to establish that no adequate remedy at

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1/ See Restatement of Torts § 951 (1939). Both remedies were sought in Weber v. Rosen, Pottock v. Continental Can Co., and Phillips v. Elk Paper Mfg. Co. discussed in the appendix.

law is available (i.e., that damages would be insufficient), a damage claim limited to past harms would in no way undercut the plaintiff's position with regard to the injunction. Moreover, an attorney could plead in the alternative for damages reflecting future harm (or a loss in the market value of the property) in order that he might not be shut out entirely in the event that the court should decide that the injunction should not issue for reasons related to the balancing of hardships. There is no reason to think that an ordinary attorney would have any doubt about the feasibility of proceeding to seek damages and an injunction at the same time. In short, we are at a loss to explain why the few cases involving injunctive relief alone did not include a claim for damages.

Even more remarkable, however, is the apparent infrequency of private air pollution cases generally, whether seeking damages or an injunction or both. The total of perhaps eleven cases in a period of fifteen years (and only five since 1958) is surprisingly small in an area so heavily populated and industrialized. Certainly no explanation can be found in the quality of the air in the region. Philadelphia would seem to be a fairly typical urban center, no more and no less concerned about environmental quality than most other cities of comparable size and industrial development. Climatic conditions have not blessed the city in any particular respect, and all other pertinent factors seem to suggest that Philadelphia is an area with a pollution problem of considerable dimensions. Why then have there been so few private efforts to abate air pollution through litigation based on traditional theories of private nuisance, which seem adequate in Pennsylvania, New Jersey, and Delaware to support most efforts to rectify serious conditions of this kind?

Interestingly, the best conclusion on this point that we can reach is of a sociological character. We would advance as a hypothesis that urban dwellers are less inclined to pursue private rights against pollution sources than are their rural counterparts. We think there are two reasons for this: (1) a greater insensitivity to pollution or tolerance of it, and (2) the lack of a readily identifiable pollution source against which to proceed. These two dimensions of the urban dweller's plight may be part of the same phenomenon. Pollution may appear to be one of the prices of living in an urban center, one of those inevitable and irremediable conditions that the urban dweller accepts as the price of living close to services and centers of economic activity. Responsibility for the pollution condition is perceived to fall on city government rather than any single emitter, and no potential plaintiff is led to recognize his own ability to attack the problem directly. Moreover, elimination of any one source seems to promise so little improvement in the over-all condition that the private remedy seems unlikely to justify its cost.

The validity of the hypothesis just stated is borne out by a somewhat broader look at the development of Pennsylvania law. While no exhaustive study has been attempted, it appears that most of the case law involving air pollution in Pennsylvania has in fact originated in less urban settings. Thus, a number of important cases have arisen directly out of experience with "culm banks,"2/ which are phenomena connected with mining, a rural undertaking. Other cases

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2/ See, e.g., Evans v. Moffat, 192 Pa. 204, 160 A.2d 465 (1965); Waschak v. Moffat, 379 Pa. 441, 109 A.2d 310 (1954).

involve such things as isolated industries in rural locales,3/ semirural slaughterhouses,4/ gravel operations,5/ dumps,6/ and similar operations generally situated in sparsely populated areas.

The conclusion of this evaluation is that private air pollution litigation serves as a useful check on pollution conditions only in areas where pollution has not become a generally accepted feature of the environment, and that the motivation to sue is stronger among those who have not become conditioned to a polluted atmosphere. Thus, the prerequisites for effective use of the private remedy as a mechanism for pollution control are these: (1) an aware population including individuals attaching a high value to freedom from pollution conditions; (2) an easily identifiable source, inviting someone to come forward as a plaintiff to demand its abatement; and (3) an environmental condition that can be materially and recognizably improved by the success of a single lawsuit.

A few additional explanations for the Pennsylvania experience may also be offered, although we feel that these are of lesser significance than the considerations pointed out above. However, each of the following points suggests that the experience of the past may not be an entirely adequate guide to the future and that therefore a greater role for private litigation may be anticipated as time goes on. The following numbered paragraphs suggest the additional considerations that have occurred to us:

(1) Public awareness about air pollution is a relatively recent and still intensifying development, and it may be expected that even in urban environments potential plaintiffs may become more and more common as groups of citizens organize for the purpose of mounting efforts to supplement those of public authorities.

(2) The greater activity of public authorities may have either of two effects: it may generate such public confidence that private plaintiffs will become even less likely to undertake the burdens of litigation themselves and may be content to complain to the control officials. Or, alternatively, they may be found to be useful adjuncts and helpful in the process of developing evidence and in preparing cases the responsibility for which is accepted by private groups. Attorneys may feel freer to accept cases of this kind in the knowledge that expert testimony is obtainable, and a public official may find it appropriate to appear in an amicus curiae role on behalf of private plaintiffs. Some agencies, it should be noted, are prevented by law from assisting private litigants.

(3) Attorneys may become better acquainted with the problems of proving air pollution nuisance conditions, and may be more willing to accept cases in this field. Trial lawyers have been recently encouraged to make efforts of this

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3/ See, e.g., Heck v. Beryllium Corp., 424 Pa. 140, 226 A.2d 87 (1966).

4/ See, e.g., Hostetter v. Sterner's Grocery, 390 Pa. 170, 134 A.2d 884 (1957).

5/ See, e.g., Falls Township v. First Falls Realty Corp., 6 Bucks 6 (C.P. Pa. 1957).

6/ See, e.g., Scholl v. Alderfer, 74 Montg. 346 (C.P. Pa. 1958).

kind,7/ and there is some basis for confidence that these calls will be heeded as attorneys become aware of opportunities to engage in public causes that are likely to generate both enhanced reputations and substantial fees.

(4) Legal precedents may be expected to become more favorable to plaintiffs as time goes on and pollution receives greater public attention. One highly publicized decision for a plaintiff in a pollution case should generate further litigation of a private nature. In the Philadelphia area, for example, the success of the plaintiffs in the beryllium cases or the success of King Farms in its suit against U. S. Steel could be expected to generate new litigation against these and other defendants.

B. Appraisal of Cases and Data

One of our objects has been to delineate the substance of an ideal judicial damage award for our purposes, one which would be of maximum value in a cost-benefit study. Such an ideal award would provide, for example, complete data on atmospheric concentrations, itemization of all damage items, factual completeness, and analytical precision. Naturally, these elements are not present in all the litigation analyzed in our study, and only occasional decisions will provide data in such readily usable form. The purpose here is to discuss various items of proof or analysis in light of their helpfulness and their presence or absence in the cases we have considered.

References are made throughout this discussion to the specific cases analyzed in the Philadelphia region and set forth in the appendix. These cases are used to illustrate either the presence or lack of a specific feature that would be found in an ideal case. The Maryland case of Phillips v. Elk Paper Mfg. Co. is continually referred to throughout this discussion because it comes closest to being an ideal case for the purposes of a study of this kind. Appendix E sets forth the decision in this case, which is unreported.

The Elk Paper case involved actions for damages and for a permanent injunction by 32 complainants against a paper mill utilizing the kraft process. The injunction was granted and damages were awarded to the plaintiffs. The nature of these damages and the analysis of the court in arriving at dollar amounts make the case a promising one for use in a cost-benefit study. These desirable aspects of the case will be developed in the following paragraphs.

Property damage as distinguished from personal injury. Three of the cases with which we have been concerned, Elk Paper, Weber v. Rosen, and Pottock v. Continental Can Co., concern property damage caused by particular pollutants. We have concluded that only cases involving property damage in a nuisance context can be used in a cost-benefit study. The reason for this is that property damages lend themselves to economic generalization while personal injury awards do not. Property damage is usually of a type that affects property generally,

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7/ See generally articles in Trial, Aug.-Sept. 1969. See also Bellis, Kolsby, & Wolfe, "Legal Approach to Industrial Pollution," Trial, June-July 1968, which specifically focuses on Pennsylvania law.

and if property is categorized by type--e.g., as residential (perhaps three classes), industrial, agricultural, or forest--the effects leading to the damage award could be assumed to be approximately the same over all property of a similar class affected by similar concentrations. We have attempted in Part V of this report to suggest how a process of generalization of this kind might be used in extrapolating damages. We believe that no similar extrapolation could be made using personal injury awards.

The difficulty with personal injury awards is that they are unique to the individual plaintiff and limited to the particular factual context. The rule in most jurisdictions is that the polluter (the defendant) must take his victim as he finds him, i.e., must assume responsibility for all harms caused to the plaintiff even though those harms may have been indirectly and in part the result of some pre-existing condition or some special susceptibility that sets him apart from the rest of the community.8/ Because damages arrived at under this rule are unique to each plaintiff, there is no possibility of generalization as to other individuals, since there is no way of knowing how typical the plaintiff is; indeed, it is reasonable to assume that he is among those most severely affected by the pollution condition.

The beryllium cases provide excellent examples of personal injury claims based on air pollution. The appendix sets forth the case of Mrs. Heck, whose damages appear to lie in the neighborhood of $110,000. The nature of the damages is spelled out, and it is clear from this description that it would be impossible to make any estimate of what some other person's damages might be. The appendix also notes the existence of a number of other cases pending against Beryllium Corporation, and it is our belief that even if all these cases were litigated to a final judgment or settled for amounts that we could ascertain, there would still be no realistic basis for projecting the total harm done by beryllium pollution in the Reading area during the periods in question. It would, of course, be possible to say that the health effects were very great, in excess of some considerable amount. Some projections could be attempted, but these would be necessarily unscientific. It is also clear that the beryllium situation in Reading was practically unique in terms of the toxicity of the pollutant, the identifiability of the source, the seriousness of the consequences, and the availability of a large volume of litigation concerning the effects. Since most health effects of pollution are less readily identifiable, the chances of obtaining from private litigation a basis for extrapolating damages connected with any particular concentration of pollutants would seem to be insurmountable. The problems of generalizing as to the effects on one individual from those found to

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8/ A contrast can be drawn between such personal injury damages and the annoyance and discomfort award in a nuisance action. The latter is specifically related to the annoyance and discomfort of a person of ordinary sensibilities and not those of the specific plaintiff. As indicated in Part II-C of the report, this circumstance is of considerable significance in identifying an economically relevant item of harm, namely lost consumer surplus. We there concluded that if each plaintiff were entitled to recover for his personal annoyance and discomfort there would be a risk that the sample would be warped and the results biased in an upward direction. This is precisely the problem in dealing with personal injury damages. See the discussion of the Elk Paper case in Part IV-C infra.

have occurred in another individual are simply too great, requiring analysis and comparison of the complete physiological condition of every individual in the community.

Finally, personal injury damage awards might be used for the purpose of attaching values to specific health effects detected by other means. If the purpose was simply to know what chronic respiratory disease--or some other condition--was "worth" to a jury, there would be no need to confine one's search to cases specifically involving air pollution. Personal injury lawyers have access to sources setting forth the amounts of jury awards for specific conditions.9/ These are used in determining whether to settle cases and for other purposes and might be consulted to determine the likely range of compensation for certain pollution-related harms. An even more useful source might be found in the workmen's compensation field, where it is likely that a large body of data could be located specifically involving respiratory conditions caused by polluted air on employers' premises. These possible sources of data are not within the scope of this study.

Specification of elements of damage. Two property damage cases, Weber v. Rosen and Elk Paper, indicate the range of damages that may be claimed in a private air pollution nuisance case. As discussed in the appendix, the Weber case involved claims for property depreciation, annoyance and discomfort to the plaintiff and his family, moving expenses resulting from extreme pollution, punitive damages for malicious conduct, and the cost of litigation. Elk Paper involved property depreciation, loss of use, loss of profits, and discomfort damages. The two cases cover for the most part the entire range of damages that might be sought in a nuisance case.

Although plaintiffs in most cases will claim damages of many different kinds, many awards, particularly those of juries, will not be itemized, with only a lump sum awarded. The situation may preclude an accurate analysis of individual damages in accordance with the analysis set forth in Part II of the report. Of course, the proof presented in the case might adequately delineate the items of damages and suggest the content of the total award, or the damage claims might suggest that no adjustment of the total was required. Still, a great amount of speculation would probably be involved, and the survey taker in any comprehensive study might be required to engage in some guesswork and to devote more time to the individual case than might be warranted.

The Elk Paper decision was particularly explicit in presenting and analyzing each damage claim alleged. Such a presentation lends itself to evaluation in the light of the economic considerations to identify such distortions as those resulting from double-counting. An analysis of the Elk Paper decision is set forth in section C below.

In Weber v. Rosen, no decision was ever rendered, as the case was settled prior to trial. While it is conceivable that a settled case might be used in a study of the sort in which we are interested, the effort to locate and analyze these cases would probably not be worthwhile. It would be difficult to determine the evidence on which the plaintiff relied and to relate this evidence to the amount of settlement. In the Weber case, for example, it was impossible to determine whether the settlement bore out the validity of the plaintiff's claims.

9/ E.g., Oleck, Damages to Persons and Property app. II (looseleaf 1961).

The need for evidentiary completeness. The evidence in the case would have to be sufficient so that one could estimate whether a particular harm attributable to the pollution condition could be expected to be reflected in the market value of the property. As noted in Part II of the report, some harms, such as odors and aesthetic effects, would be sufficiently apparent to all observers that the market price of the property could be deemed to discount fully for the pollution condition. Other harms flowing from pollution, such as long-term health effects, would be less likely to be reflected in market value because of the information deficiency. The nature of these effects must be sufficiently determinable from the court's judgment or from the evidence that one could make a judgment as to whether double-counting was likely to be present in a specific damage award.

It would also be necessary to form a judgment about the presence or absence of consumer surplus and its loss, and this would in turn require that the court's judgment or the evidence disclose any facts that would indicate its presence. A questionnaire directed to the plaintiff's attorney might be helpful in this regard, but we have concluded with respect to the Elk Paper case discussed below that the existence and loss of consumer surplus can appropriately be presumed where residential property subjected to a new pollution source is concerned.

Analytical precision. The quality of judicial analysis will vary from case to case, and in some instances may be inadequate to permit any judgments to be made about the damages involved. In this respect, it is possible to contrast the Elk Paper case with two cases decided in the Court of Common Pleas of Berks County, Pennsylvania: Stanislaw v. Reading Corrugated Container Corp., 48 Berks 63 (1955); Eisenbrown v. Bowers Battery & Sparkplug Co., 48 Berks 248 (1956), exceptions denied, 49 Berks 172 (1957). Both of these latter cases awarded compensatory damages, including decline in property value and the expenses of repair, and deprivation damages, ostensibly including loss of use of property plus discomfort and annoyance. As deprivation damages, the court allotted an identical amount to all 27 plaintiffs in the Stanislaw case and to all 20 complainants in the Eisenbrown case. This suggests that the court made no effort to distinguish the circumstances of the various plaintiffs, as it might have done in seeking a more accurate award.

In the Elk Paper case, the court analyzed the situation of each plaintiff in considerable detail and varied the annoyance and discomfort damages according to the particular circumstances of each plaintiff. To some extent, it seems that the court may have overstepped the rule that such awards should be based on the effect on persons of ordinary sensibilities rather than on the particular plaintiff's own reactions. Still, the difference in the location of each plaintiff, the extent of his exposure to the source, and other factors would result in some variation among plaintiffs in particular cases. In any event, it would seem appropriate to use the total amount of the award in this case as a guide to economic damages, since given the large number of plaintiffs it seems unlikely that the average award would depart very far from the community average. In addition, the appraisal bears sufficient authoritativeness and represents sufficient judicial conscientiousness to warrant use of the figure derived.

Evidence of air quality. As can be seen by a perusal of the appendix, some of the cases researched provided substantial data concerning air pollution levels, data vital to the purposes of a cost-benefit study. One problem arises with respect to cases like the beryllium case where no accurate or complete

records of pollution levels have been kept, either by the offending company or by a government control agency. Such a gap in the data greatly diminishes the value of a case for our purposes. As time goes on lawyers and expert witnesses can be expected to become more sophisticated and to provide more complete data respecting pollution levels. Control agencies will provide more complete measurements of air quality, and these will sometimes be available to plaintiffs' attorneys.

In cases where data is incomplete, it may be impossible to use a case for purposes of a study of this kind. In Part V of the report it is suggested that useful data can probably be most readily derived only by surveying cases that are currently in progress, allowing local control agencies to collect concentration data concurrently in a form that will be usable in a cost-benefit study. In some instances cases already decided might be adapted for study purposes by employing concurrent government concentration data as an air quality guide even though the data was not included as evidence in the case.

If only emission data are available, there will be problems in extrapolating pollution levels at distant points, but this can be done by use of standard techniques, as in the beryllium case. A greater problem may be to derive from each case sufficient data to make the case comparable with others. The difficulties in this regard are treated in Part V of the report, but deriving a single figure to define and compare air quality will be difficult in any event, whether or not data is complete.

C. Analysis of the Elk Paper Case

Elk Paper represents a carefully reasoned and reasonably sound judicial decision, and we felt that analysis of the damage award would serve to exemplify the previous discussion of legal and economic damages (Part II of the report) as well as the foregoing appraisal. The case encompassed three distinct damage claims: (1) loss of use and enjoyment of property to 31 families; (2) discomfort and annoyance to these 31 families; and (3) loss of profits by a land developer. The nuisance was a kraft paper mill the operation of which was enjoined after six months of operation. The damages allowed thus covered a period of six months. Presumably damages for six months' harm could be extrapolated to approximate permanent harm for use in a study attempting to generalize from such experiences.

Loss of use. In arriving at damages for loss of use of residential property to its respective owners, the court utilized sound economic analysis in measuring the hypothetical loss that would have obtained had the property been rented. This measure avoided the error of treating "loss of enjoyment" as personal loss rather than a loss of market value.10/ The amount of lost rental value was ascertained from the testimony of an expert appraiser, who compared comparable sales in nearby areas. No serious objections were brought up in cross-examination of this expert, and the court accepted most of his figures. A certain degree of arbitrariness is detectable in the testimony, and the degree of diminution--ranging from 25% at 1 1/4 to 2 miles to 75% within 1/4 miles--may seem excessive. Nevertheless, the result would seem entirely acceptable for our purposes. The court held that the expert's "approximate

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10/ See Part II, note 9, supra.

rental value adjustment," by which he increased the rental loss on the higher priced homes on the theory that a tenant who could afford to pay such a high rent would not live under pollution conditions for any price (high marginal rate of substitution), was speculative and therefore unacceptable. Although the expert's economic theory here seems plausible, we would accept the court's judgment that the attempt to calculate this increased valuation was arbitrary. This would appear to be a case where the burden of proof may have produced some understatement of damages to valuable residential property.

The court distinguished between loss of use of business property--an animal hospital and a garage--and loss of use of residential property. It stated that damages would be awardable only if some loss of business were shown, and allowed no damages because of plaintiffs' failure to carry the burden of proof on this point. This analysis assumes that the utility of the building for conducting business is not affected without a noticeable loss of business, ignoring possible loss of goodwill, discomfort of customers and discomfort of employees, and failure of the business to grow. Here the burden of proof clearly resulted in an understatement of damages, to the extent that the case should not be treated as a holding that zero damages resulted from the pollution condition.

Annoyance and discomfort. The court observed at several points that different individuals would react differently to a pollution condition and proceeded to differentiate the individual plaintiffs in this respect. As noted earlier, the court in so doing appeared to ignore the general principle that annoyance and discomfort damages should be determined with reference to the nuisance's effect on a person of "ordinary sensibilities."11/ The awards thus suffer from the defect, noted earlier with respect to personal injuries, that they may not be subject to generalization. Even so, in view of the large number of plaintiffs, the insignificance of the variations, and the fact that most of the differences reflect distances from the source and frequency of exposure, we would accept the court's findings for purposes of generalizing from this experience.

The court professed awareness of the double-counting problem throughout its opinion and manifested a desire to avoid any double recovery. In the first place, the fact that the pollution was in the form of a largely harmless odor rather than a more insidious element would tend to preclude justifying any apparent double recovery on the basis that the market price failed to reflect the pollution condition adequately. Whether a loss of consumer surplus, another justification for double recovery, occurred could only be determined by viewing facts not apparent on the fact of the decision, but the court may be fairly deemed to have presumed loss of consumer surplus on the basis of two facts: the residential character of the property and the property owners' proved special sensitivity to the pollution. The warrant for such a presumption seems entirely adequate, a fair reflection of the community's general sense concerning the inviolability of a man's home. This conclusion appears largely to eclipse the double counting danger where residential property is concerned, and we are prepared to accept this result as a reasonable one under all the circumstances.

Finally, the annoyance figures arrived at by the Maryland court might be questioned economically in light of the court's stated willingness to adjust damages upward or downward in accordance with the "motive" of the polluter, a factor clearly not relevant to our purposes. While such a factor would be difficult to shake out of any annoyance award, it does not appear to have been a significant influence in Elk Paper.

11/ See Part II, notes 3, 10, supra and accompanying text.

Air quality data. The court's decision provides no data on air quality during the six-month period other than the vivid descriptions of the odor given by the witnesses. Whether evidence on this point was presented we are not aware. If not, the case might be of no use in any generalizing effort unless the data could otherwise be obtained or unless enough is known of kraft paper mills to make some reasonable estimates.

V. Proposal

In spite of the disappointing results of the Philadelphia survey, we believe that it might be possible to structure a nationwide litigation survey that would, over a period of time, yield data permitting construction of a model from which a reasonable estimate of damage caused by air pollution in particular circumstances might be made. Such a survey would be difficult to accomplish, and the following paragraphs set forth such of the difficulties as we are able to foresee. However, we have attempted to make no final judgment on the feasibility of the survey for several reasons: (1) as lawyers, we have only limited understanding of the statistical, research, and evaluation techniques that could be used in such a survey; (2) our ability to judge the comparability of the data obtainable and the precision of the results needed or reached is limited by our inadequate technical background in air pollution; and (3) the desirability of undertaking such a study should be determined only after other means of arriving at similar estimates have been evaluated and after the need for additional studies confirming the results of other estimates has been determined.

The purpose of the proposed survey would be to obtain from as many litigated private nuisance cases as possible comparable data concerning the air quality conditions involved and the resultant damages. From such data there might be developed a set of functions relating atmospheric concentrations of pollutants (averaged or otherwise quantified in some appropriate manner) to the judicially determined corresponding damages, stated as a percentage of the original value of the real property affected. A "scatter diagram" of the type that might be developed is set forth in Figure 1. Each point in the diagram would represent the holding in a single litigated case plotted from coordinates as indicated in Table 1. 1/ The table sets forth the data respecting hypothetical cases A through F, each coresponding to a point in the diagram. The curve shown is drawn by guesswork but can be drawn mathematically. Such a function would permit determination, from concentration data alone, of the approximate effect of SO_2 emissions (including marginal effects) on residential property values. A series of such linear functions would be developed for each contaminant--one for each of several classes of property.2/ Some of the numerous problems of carrying out such an analysis are discussed below.

General scope and utility. It is important to note that the functions thus developed could be used nationwide. By reducing the effects of air

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1/ A case like Elk Paper might yield several points. There the court found rental values reduced from 25% to 75%, depending on proximity to the source (i.e., air quality).

2/ Possibly three classes of residential property in addition to industrial, commercial, agricultural, and forest land.

Figure I

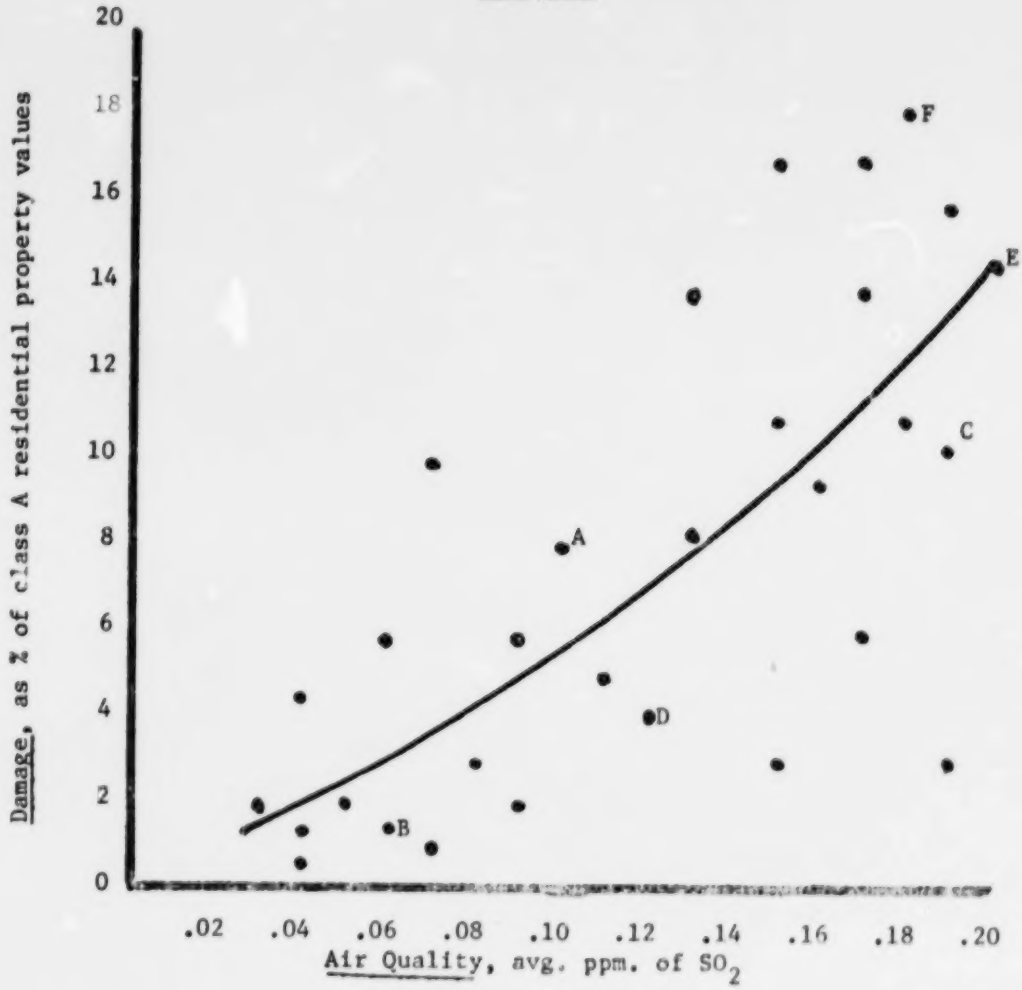

Table I
Summary of Data from Cases Involving
SO_2 in Class A Residential Areas

Case	Damage Award			Air Quality
	Actual	Adjusted	As % of Prop. Value	
A	2,000	2,000	8.0	.10
B	300	450	1.5	.06
C	8,000	6,500	10.5	.19
D	800	800	4.2	.12
E	3,000	2,500	15.0	.20
F	20,000	20,000	18.3	.18

pollution to a percentage of property values, the results would be made applicable to any particular region, airshed, neighborhood, or property. The classification of property permits the neighborhood characteristics to be taken into account, and the use of percentages will result in greater damages in areas where property values are higher.

The nationwide applicability of the functions also may help to avoid the chief difficulty encountered in Philadelphia, namely that cases in any single airshed are too infrequent to produce a meaningful sample. Even nationwide, it might take a long while to provide adequate data on some contaminants or some classes of property, 3/ and even this estimate assumes that private litigation will not be reduced in volume by active control efforts by public authorities. Some contaminants generate less litigation than others that may be equally harmful though in a different way. Thus, lawsuits based on a nuisance theory are more likely in the case of odors than where more insidious pollutants are involved, and it might be that a pilot study to assess the harm attributable to odors would be advisable as a means of testing our concept.

It might, of course, prove impossible to reduce a sufficient number of cases to comparable form so that a curve could be plotted. Nevertheless, some attention should be given to the possibilities in order to know whether the approach must necessarily be ruled out. Since the present study establishes that court records in decided cases are not likely to yield the kind of data necessary to prepare a table of comparable data, it would appear that the only feasible approach would be to have cases monitored by local control agencies while they are in litigation in order that data of the type needed can be obtained currently, usually with the cooperation of the attorneys in the case. This would mean that local control officials might have to take measurements of the air quality themselves and might have to obtain appraisals of the real estate in order to derive the needed data. Thus, the proposed survey would probably have to be prospective rather than retrospective and would have to be mounted with the cooperation of control officials throughout the nation. It is on the assumption that such an effort could be mounted that the following discussion proceeds.

One major difficulty in conducting any survey of the sort proposed would be the anticipation of all the possible difficulties that might be raised by particular cases. If it were not possible to devise a questionnaire and operating procedure that would permit this survey to be taken by relatively untrained personnel without undue attention to each case, the cost involved might be prohibitive. Some of the difficult problems that must be considered are mentioned here, but it is very likely that many other problems would arise in individual circumstances. There would have to be some means of detecting these particular difficulties and resolving them as they occur in order that each case could be interpreted correctly for purposes of the analysis. It would seem essential to have one person or a small staff interpret each case individually as it arose with the help of the data obtained by field personnel. Presumably MAPCA would have the resources to mount such an effort.

Damage data. The damage award in each case would have to be carefully studied in order to make the data useful. As indicated in Part II of the report, legal damages may need adjustment in order to assure their utility for the

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3/ Once enough data was accumulated to plot a tentative function, it could nevertheless be modified as further experience accumulated.

economist. The report attempts to set forth some guidelines that would be useful in adjusting jury findings for the economist's purposes, and some assumptions can be indulged as we have done in analyzing the Elk Paper case. These guidelines might be reduced to a questionnaire to be answered by the attorneys in each litigated case. Adjustments could be made using formulas incorporating data from the questionnaire, and the final figure could then be used in relation to the pre-existing market value of the affected real estate as a means of arriving at the coordinate on the vertical axis in Figure 1. 4/ Where necessary, a real estate appraisal might be obtained or an estimate could be developed from tax records. Where the evidence in the case dealt with real estate values, those figures might be deemed conclusive if there was no dispute or conflicting evidence. In most instances, the survey taker would have to make judgments concerning the appropriate value to be used and the classification of the property, but guidelines would have to be provided to facilitate these judgments.

As noted in the guidelines in Part II of the report and again in Part IV, certain types of damages would have to be excluded in extrapolating from specific damage to general pollution damage. The difference is between unique damage suffered by the property owner and damage suffered in common with his neighbors. Where claims for reduced market value of property alone are made, the relevance of the finding on this point is clear. Difficult questions would arise in particular cases, however, and it is not clear that a guideline could be developed to facilitate a valid survey. Some cases might have to be excluded from the survey altogether simply because the findings were not sufficiently clear or because there was no basis for separating out the various elements of damage. Use of presumptions, as was done in analyzing the Elk Paper case, may minimize this problem.

Air quality data. With respect to the air quality data, a different diagram would have to be developed for each contaminant. Special problems would arise where the defendant emitter was only one of several sources responsible for that particular contaminant; the damages awarded in such a case might be thought to represent only the marginal contribution of that particular emitter rather than the total damage from the presence of the contaminant in the atmosphere. As it stands, Figure 1 is based on the assumption that the polluter is responsible for all the pollution complained of, a reasonable assumption in a nuisance case involving odors or arising in a rural environment. But where the defendant's contribution was incremental, a more sophisticated analytical mechanism would be called for. 5/

Synergistic effects might often confuse the issue even to the extent of

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4/ Whether annoyance and discomfort damages should be lumped with reduced market value in developing the function is perhaps unclear. An alternative might be an additional curve relating per-person dollar damages to contaminant concentrations. But this would seem needlessly confusing as well as inconsistent with our analysis of the justifications for allowing such damages for economic purposes--to make up for the market's failure to discount pollution fully or to compensate for lost consumer surplus--both of which justifications are property-related items and distinguishable from occasional health effects. But see Part II, note 16, supra.

5/ Presumably, once the slope of the curve was determined from data drawn from cases involving sole sources, that slope could be used in apportioning damages to each increment attributable to a polluter in a multiple-source situation.

requiring a case to be left out of the survey. Synergism raises issues similar to those involved in incremental pollution situations; it is far from clear how courts would respond in assessing damages in either case, but under traditional tort principles, each polluter would probably be jointly and severally liable for the incremental harm. The economics of this treatment exceeds our competence.

Likewise, meteorological conditions and the variability of concentrations over time would complicate the comparison of one case with another, and a judgment as to whether average concentrations are a fair measure would have to be made. It may prove altogether impossible to reduce each case to a single air quality index that could be represented in a two-dimensional model. Perhaps a computer could analyze the case in more dimensions by regression analysis. Again, we feel inadequate to reach even a tentative conclusion.

Conclusion. Obviously, the foregoing analysis indicates that serious problems would be involved in any effort to conduct a survey of the sort indicated. Nevertheless, this kind of effort would seem to be the only possible way of using damages awarded in private litigation as a guide to over-all pollution damage. Because our expertise in the technical aspects of the problem is limited, we cannot express any final judgment on the utility of the approach suggested. Again, the issue can only be settled by comparing the promise of this technique with that of others and the possibility of using two techniques or more to produce estimates that are better supported.

Lastly, it would appear to us that the authoritativeness accorded determinations of courts in the society would lend particular force to the conclusions reached by a survey of the sort proposed. Moreover, society's conscience and numerous intangible factors of importance to the community but incapable of measurement by objective means may be reflected in judicially determined damage levels that may for this reason be higher than estimates economists could obtain by any kind of collection and manipulation of market or other data. Because we believe that any estimate derived from such authoritative findings would have greater credibility than other estimates and might help to boost control efforts by quantifying such intangible factors, we propose that serious attention be given to the undertaking of a survey along the lines suggested.

APPENDIX A

Case Description

Pottock v. Continental Can Co., 210 A.2d 295, 211 A.2d 622 (Del. Ch. 1965)

This was an action brought by a lessee of a lot in Wilmington which is operated as a junk yard. The defendant, Continental Can, owns a plant which has been in operation since 1945 adjacent to this junk yard. The nuisance claim is based on the substantial quantities of oily soot emitted from a smokestack serving defendant's boiler. Plaintiff sought a permanent injunction and damages.

Plaintiff buys and sells metals and rags on his one-acre plot. The rags are baled and stored in covered areas, and the metal is sorted or cut to prescribed sizes and exposed to the elements, although most of the exposed material is turned over rather quickly.

Defendant's plant primarily manufactures bottle caps. The oiliness of the soot from its stack was apparently greatly decreased in December 1963, when an additive was first utilized in the boiler. The periods of greatest fallout occurred when the tubes of the boiler were blown, a process where high-pressure steam is forced through the passages to dislodge accumulated deposits. This is done once every 24 hours. The prevailing wind is such that it carries much of the soot over plaintiff's property.

The use of the new additive in 1963 became the basis of two holdings. First, an injunction was denied on the basis that since 1963, the damages suffered by the plaintiff were not of a nature to justify injunctive relief. Second, the damages recoverable by plaintiff were limited to the pre-December 1963 period, the judge considering the oily properties of the soot the governing factor.

The following discussion indicates the level of pollution present at various times and explains its significance. Next, the damages awarded are indicated and compared with the economic damages suffered.

Explanation of Data. The AISI Sampler data (Exhibit A-1) were taken in three intervals from January 21 through November 28, 1964, by a registered civil engineer retained by the plaintiff. The tests consisted of drawing air through an automatic air sampler and, through the use of a photoelectric cell and an ammeter, measuring the discoloration in O. D. units (optical density), which were then converted to COH units (coefficient of haze). Although these results were not admitted as evidence in the trial, the reasons for such refusal fail to preclude their accuracy. This judicial determination can partially be attributed to an unfamiliarity with such tests, the court never having encountered them before, and partially to the general disfavor which it seemed to show toward private air pollution litigation in 1965. The reason given by the trial court was that it saw no meaningful correlation between the tests and defendant's particular operation. The basis of this holding was that the scale used in interpreting the results was developed in New Jersey, not in Delaware, and hence had no apparent relevance. This evidentiary

problem arose from the fact that no testing had been made by any government agency in the area from which a standard could have been developed until 1968. The data does indicate, despite the lack of an interpreting standard, the polluting condition that existed as a result of defendant's plant. Plaintiff might still have avoided this obstacle by taking emission data.

Certain peaks deemed abnormal by the testor are indicated with a red dash. These generally occur during the late night and early morning hours, when, as a result of the decreased traffic, lower wind velocity, decreased industrial activity, and increased moisutre, the degree of pollution would be expected to be lower. As defendant's plant operated on a 24-hour basis, these peaks can be partially attributed to it.

Chemical Tests. The chemical analyses run by the plaintiff's expert witness indicated a decrease in the oily properties of the soot as of December 1963. One pre-December sample indicated that the particles could be described as "black flashes," 0.002 to 0.003 inches in diameter, consisting of 60% carbon and 40% zinc, iron, and silica, which, as a result of the oily properties, ignited at 350 to 400 degrees Farenheit. Another analyzed sample consisted of 71.8% carbon, 5% silica, 12.2% sodium compounds, 8.5% calcium oxide, and 2.5% insoluble residue, averaging 0.004 inches in diameter and burning at 800 degrees Farenheit.

An analysis of samples at varying distances from defendant's stacks indicated particles over 30 microns in diameter at 40 feet, 20 to 30 microns at 75 feet, and about 8 microns at 120 feet. A fallout test during one of the days of heaviest particulate matter in the air indicated an average fallout upon plaintiff's yard of 0.533 ounces of soot per 100 square feet.

Damages. The damages claimed by the plaintiff consisted generally of cost of painting of equipment and office, additional labor expense, loss on sales, and cost of disposal of worthless merchandise. An itemized account of the damages claimed follows:

Item	Amount
Repainting of trucks (2)	$ 325.00
Repainting of crane, 72-inch press, 66-inch press, rag scale, warehouse scale, gates, outside door, and 2 walk-in safes	808.00
Additional labor required	2,369.28
Loss on sale of rags, 443,058 pounds at $.01 per pound	4,430.58
Loss on sale of metals	
134,440 pounds at $.03 per pound	4,033.20
407,188 pounds at $.01 per pound	4,071.88
Loss on sale of iron	
2,147,.0943 tons at $2.00 per ton	4,294.19
Loss on cash sales	2,605.27
Cost of hauling and disposal of worthless items	153.50
TOTAL	$23,090.90

Analysis. In refusing the plaintiff the injunctive relief which he sought, the court necessarily deemed the defendant's plant to be a permanent nuisance. But by limiting the plaintiff to only those damages suffered prior to December 1963,[1/] the court in a sense converted the permanent nuisance to a temporary one. From an economic standpoint, the refusal to allow post-1963 damages was wrong, and the plaintiff's recovery becomes an inadequate measure for the economist's purposes. The fact that the defendant had adopted a more enlightened policy means not that plaintiff's losses disappeared entirely but only that defendant had discharged his legal duty.

The court refused plaintiff's claim for loss on sale of rags, metals, and iron to his customers. The nature of the damages to these items varied. The soot and oil deposited on the rags made handling difficult and required washing by the customer before they could be processed for fibres, insulation, and other similar uses. Plaintiff claimed that, as a result of the dirtied condition, the customer paid one cent less per pound for the rags. The iron and other metals also were covered by a black, sooty film. Since most of the items were large (such as I-beams), it was necessary to cut them into smaller sizes for shipping. An acetylene torch, the usual method, could not be used on plaintiff's items because the oil would burn upon contact with the torch creating a hazardous condition. Another more expensive method had to be utilized resulting in a decreased profit margin, it was claimed, for plaintiff's scrap. Although, as the court mentioned, the metal was already dirty and rusty, the oily condition causing the claimed decreased value was attributable to defendant's plant.

Even though plaintiff's witnesses established the price paid for the scrap and rags, plaintiff found it impossible to prove the market price of the items had they not been damaged. Weekly trade journals indicated the market price of scrap in the Wilmington vicinity, but the prices plaintiff received were consistently equal to or greater than these prices. Also, many of the witnesses purchased scrap without inspecting it and without indicating any reduction in price. Plaintiff failed to relate the prices he received to the prevailing market price, and the uniformity of the prices paid to plaintiff over an extended period indicated no variation during periods of high and low pollution. Even counsel for the plaintiff later agreed that he felt these items of damage were not sustainable. The fact that the market value of the scrap did not reflect the effect of the pollution must have resulted from either of two conditions. An information deficiency within the market structure could have been one condition. This is unlikely, however, since the soot was entirely visible, and plaintiff's customers had realized the problem and had complained intermittently. The most plausible rationale would be that the effects of the sooty condition of the scrap were not great enough or were not of such a nature as to have a detectable effect on its market value.

Although the court disallowed it, plaintiff's claim for the cost of additional labor was realistic but might have been better designated. It would seem likely that the plaintiff and his employees would have to spend longer hours cleaning their equipment and the soiled scrap or protecting the more valuable items. Plaintiff, however, found it impossible to prove to the court's satisfaction what

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1/ The first paragraph of the opinion (Exhibit A-2) appears to allow damages for April to December 1965. This is a typographical error.

portion of his efforts were a result of the pollution. We feel, however, that this was a factor in plaintiff's damages and today would have been an element in his recovery. To this additional extent, then, the legal damages awarded fell short of the economic damages suffered.

Since the case involved a junk yard, it is distinguishable from the typical real property case. No double-recovery problem existed since only three definite and distinct items of damage were awarded and no lost property or use value and no general annoyance figure were included. The direct costs of painting the trucks, the crane, the 72-inch and 66-inch press, the rag and warehouse scales, the gates and outside doors, and the two walk-in safes were clearly proved and rightly compensable. The cost of hauling and disposing of items rendered worthless by defendant's pollutants was less definite but still adequately proved. The legal damages awarded were a sufficient reflection of the economic damages suffered by the plaintiff between April and December 1963, with the exception of the unproved increased labor award, which, when considering similar cases and the evidence of eighteen years of continuous pollution, should have been $1,500 to $2,000. In this case, out of the total award of $1,286.50, plus interest, after paying the attorney's fees ($500) and the expenses of the engineering consultant ($300), plaintiff netted only $486.50, plus interest. There was no item of damages sufficiently indefinite and open-ended in which the court might have included a compensatory bonus for attorneys' fees and litigation expenses, and there is no need to shake out these items. The total award thus represents real economic costs to plaintiff of defendant's pollution. To this total we would add $1,500 to $2,000 for generalized additional but unproved labor expense.

APPENDIX B

Case Description

King Farms Co. v. United States Steel Corp., 432 Pa. 140, 247 A.2d 563 (1968).

In this action, which is still pending, King Farms, which has leased farm land in the area for 25 years seeks to recover damages of $1.5 million for injury to his growing crops allegedly caused by air pollution from U. S. Steel's Fairless works in Falls Township, Bucks County, Pennsylvania. King had been engaged in farming activity prior to the plant's erection, and the damages claimed include the period from 1953 to 1968. The case may become a landmark in the air pollution field, defining private rights in the nuisance law field and giving some insight into the effects of pollution on agricultural property. A judgment for the plaintiff should encourage future litigation in the area.

At this stage in the case, no conclusions concerning the damages involved can be made. Only a ruling on a demurrer has thus far been made, with the trial to be conducted at a future time. The evidence gathered by the attorneys at this juncture is very sketchy, and this circumstance, coupled with the reluctance of the plaintiff's counsel to divulge relevant information, diminishes the value of this case until a judgment has been rendered.

Once decided, the case should offer valuable insight into the agricultural aspects of pollution damage with the long-range exposure present and the large amount of monetary damage claimed. The case also involves an annoyance claim which, being an economically difficult aspect to measure, should prove helpful if an award is made. The odor aspects of the case, unfortunately, are not distinguished in the complaint and may prove indistinguishable in a total damage award.

APPENDIX C

Case Description

Weber v. Rosen, C-2637-60 (Sup. Ct. Ch., N.J. 1960)

This action was brought by a landowner against a dry cleaning establishment adjacent to the plaintiff's property. The nuisance consisted of a "Permac" dry-cleaning machine which vented through a pipe 10 feet from plaintiff's residential property and between 3 and 4 feet above the ground. The fumes, vapors, and odors given off by this machine were described by the complaint as a "stench" and an "unbearable" odor. Plaintiff claimed that the effects of the process caused substantial and unreasonable damages and that the machine should therefore be deemed a nuisance. These effects consisted of the following: plaintiff's property depreciated in value; plaintiff's wife was unable to hang clothing in the back yard as before the machine was installed; plaintiff's children could not play outside when the machine was in operation; the health of plaintiff's family was endangered; and the windows and doors of plaintiff's home had to be closed during the hot summer months, when the stench was the worst. Weber sought an injunction against the cleaning process and claimed money damages.

Plaintiff's damage claim was a comprehensive one and included all the items we would consider legally compensable in an air pollution case. In addition to seeking an injunction, plaintiff claimed damages from depreciation in the value of his property. He also claimed an amount for inconvenience to himself and his family during the maintenance of the nuisance (which we have labelled "annoyance and discomfort" damages). Further, plaintiff sought expenses incurred by his family in temporarily moving from the family home to escape the noxious atmosphere. Plaintiff also sought punitive damages for malicious conduct by the defendant in intentionally causing the damages to the plaintiff. Finally, plaintiff sought the costs of litigation.

At this stage, the case presented the kind of clear-cut situation we were seeking. The complaint, however, did not contain an itemization of the damages in dollar amounts nor was a total damage claim set forth. The case was terminated before trial. Therefore, no evidence as to damages was presented, and the attorney involved had not yet gathered such evidence. In a settlement, defendant agreed to purchase the adjoining property of plaintiffs for a sum of $6,250. There was no way of ascertaining the relation of this figure to the market value of the property before or after the machine's installation, and counsel indicated that he did not believe the price to be particularly inflated. No dollar amount could, then, be attached to plaintiff's damages, and it is probable that he sacrificed some of them in the settlement. The case, then, provides little more than an insight into the possible damages that can be claimed in a pollution case.

APPENDIX D

Case Description

Heck v. Beryllium Corp., Ct. of Com. Pleas, Berks County, No. 312 Aug. Term 1962, judgment n.o.v. granted, 38 Berks 12 (1965), rev'd, 424 Pa. 140, 226 A.2d 87 (1966), reargument denied, --- Berks ---.

This litigation was initiated by a middle-aged couple, Ruth and Wilbur Heck, against the Beryllium Corporation, which operates a plant in Temple, Pennsylvania (Berks County). Ruth Heck has lived in the Reading area since 1926. Since the Beryllium plant began operations in 1936, Mrs. Heck has had a period of 31 years of exposure to the allegedly toxic atmosphere.

The history of the case shows extensive but still inconclusive litigation. The original action was brought in the Court of Common Pleas of Berks County in 1926. The trial resulted in a jury verdict for the plaintiffs. However, judgment notwithstanding the verdict was entered for the defendant on the basis that the jury could not reasonably have found the defendant negligent. This judgment was appealed to the Supreme Court of Pennsylvania, which reversed the decision, holding that the original jury could have found the defendant negligent in view of the high toxicity of the substance emitted but remanding the case for retrial because of overly broad instructions to the jury.

The second trial paralleled the first in many respects and again resulted in a jury verdict for the plaintiffs. A three-judge panel sitting en banc found, however, that counsel for the plaintiff had mentioned the figure $200,000 in his final remarks to the jury, and declared a mistrial on this account. An appeal from that decision is now pending, the result of which will determine whether a third trial will be necessary or whether judgment for the plaintiff will be reinstated. We do not believe that the error found in the second trial lessens the usefulness of the verdict for our purposes. First of all, it is doubtful that the one reference to the $200,000 figure could have affected the verdict. More significantly, the jury verdicts in the two trials were almost identical in total and tended to vindicate each other.

The attorneys for the plaintiff--Edward L. Wolf in the first trial and Gary C. Leedes in the second trial--were both interviewed, and the files concerning the case as well as the actual trial transcripts were used as sources of information. No difficulty was encountered in discovering the case initially, as the first appellate decision was reported. The attorneys involved were cooperative and their files helpful, although the transcripts occupied 1200 pages and were difficult to use as a source of specific information.

A large number of additional personal injury actions against the Beryllium Corporation are now awaiting trial, pending the final outcome of this particular case.

Level of Pollution. As the initial exposure to beryllium began for Mrs. Heck in 1939, it was necessary for counsel to indicate the level of pollution present from 1939 through 1967. The trial court found, however, that the defendant could only be liable for its beryllium output since March 30, 1950, a finding later vindicated by the state supreme court. The Atomic Energy Commission upon that date published suggested standards of beryllium concentration in the atmosphere

surrounding a beryllium plant, those standards being 0.01 micrograms per cubic meter for the atmosphere in the neighborhood of the plant and 2.0 micrograms per cubic meter inside the plant area. These standards, particularly the former, should be kept in mind when reviewing the data provided. The court reasoned that before 1950 the defendant had no reason to suspect that its output was dangerous and therefore could not be deemed negligent before that time. The figure of 0.01 was arrived at using a safety factor of between 8 and 10. The court, however, considered any level above 0.01, regardless of the safety factor used, to be subject to a finding of negligence.

No government agencies had made air analyses during the period in question. Plaintiff, therefore, was forced to utilize data taken by the defendant itself, such data being only available during the 1951 through 1955 period. The samples were taken by two methods--one being an impinger which placed the particulate matter into an isopropyl alcohol solution, and the other an AISI-type sampler which, through a vacuum operation, deposited the particulate matter on a filter pad, which was later analyzed. The former method made it possible to perform smaller measurements of the beryllium present, such small measurements being necessary in view of the stringent standard set by the AEC.

The various sampling stations, again operated by the defendant, were located near the plant. Mrs. Heck, however, lived from 1949 to 1952 in a home four and one-half miles south of the plant and from 1952 until the time of the trial 3.89 miles east of the plant. Since no samples were taken this far from the plant, it was necessary to extrapolate the level of pollution present at the Heck home from the values given at the various stations. Such extrapolation was done by investigating the wind reports during the period, and applying these and the station results to "Sutton's equation." Defense counsel based practically his entire case on refuting the Sutton's equation results and challenging the experts who utilized it.

The data presented in Exhibit D-1 indicate the values of beryllium found at the various stations by W. B. Coleman and Company, a consulting firm hired by the defendant to analyze the samples. The extrapolated values are also indicated, showing monthly and some hourly figures at the location of plaintiff's home. Long-range variations would be expected over the years as different abatement equipment, such as dust collectors, was installed in the plant. Also, of course, meteorological conditions, such as inversions, wind shifts, variations in humidity, would account for great variation in daily samples. These factors supposedly were accounted for in the constants used in Sutton's equation when extrapolating. Although defense counsel did point out many assumptions used in this type of analysis and also the shortcomings inherent in the Sutton method, he failed to convince two juries of their invalidity, and the results have some value for our purposes.

Damages. Beryllium is an extremely toxic element. It enters the body and accumulates rather than dissipating, thus making long-term exposures very dangerous. A number of the pending cases involve deaths allegedly attributable to berylliosis.

Mrs. Heck first noticed berylliosis-related symptoms in 1960. By 1961, she suffered spasms of coughing, had frequent ear aches, suffered controllable flickering of her left eye, clubbing of her fingers and toes, extreme shortness of breath, and pain and pressure in her shoulder and chest, became blue upon any exertion (due to the lack of oxygen in the blood), and found her weight varying considerably. In 1961, a lung biopsy was performed but no beryllium was found, a result which was never explained. When her condition did not improve, another more extensive lung biopsy was performed where a section of the lung was removed. This examination discovered 0.66 micrograms of beryllium per hundred

grams of lung tissue in Mrs. Heck's lungs.

During 1961, Mrs. Heck was partially disabled and was only sporadically employed. Since 1962 she has been totally disabled. In 1960, a normal employment year, she earned $2,168. When partially disabled in 1961, she earned $1,014. Two separate actions were involved here. Mrs. Heck claimed damages from lost wages up to the time of the trial and wages that would be lost in the future as a result of the disease plus compensation for pain, suffering, mental anguish, discomfort, inconvenience, distress, and embarrassment both in the past and to be suffered in the future. Mr. Heck claimed damages for past and future medical and hospital bills associated with his wife's berylliosis and for loss of consortium (comfort, companionship, and services of his wife).

The damage award made by the first jury was $35,000 for Mr. Heck and $75,000 for Mrs. Heck. The second jury awarded $13,000 to Mr. Heck and $96,160 to Mrs. Heck, making a total award of $109,160 as compared to the first jury's total of $110,000. Seldom do we have such an opportunity to compare two awards on the virtually same evidence by different juries. The wide discrepancy in the amounts attached to the respective claims of the two plaintiffs is perhaps not as important as the similarity in the total award. But this, too, can be overemphasized. The expectation would be that different juries will respond quite differently to the same facts and that the results of a single case cannot be reliedupon as a true indication of damage. But the results of a large number of cases would provide an average that could be relied upon, as jury "errors" may be thought to fall as often above as below the "true" figure; implicit in the conception of a "true" figure is, of course, the notion that such general societal biases as judges or juries may reflect are appropriately not discounted in measuring harm.

Other litigation. Numerous other cases involving berylliosis are awaiting the outcome of the Heck case. We have obtained a list of plaintiffs in actions against Beryllium Corporation from the Prothonotary of Berks County, but we believe this list would not cover all of the cases likely to be brought in the event of the plaintiffs' victory in Heck. In some cases attorneys have filed formal complaints detailing the claims, while in others only summonses have been filed for the purpose of preventing the statute of limitations from barring the claim. A sample complaint is included as Exhibit D-2. For possible future use, we have set forth here the names of the plaintiffs in the cases we have been able to identify, together with the case number (where available):

Julia Savini - 149 Sept. Term 1958
William F. McAlice - 147 Oct. Term 1958
Margaret B. Pannabecker - 123 May Term 1959
H. Allen Snyder, Exec. - 25 Feb. Term 1960
Peter P. Bybel, Jr. - 10 Mar. Term 1960
Barbara Bybel - 11 Mar. Term 1960
Mabel R. Kutz et al. - 123 Nov. Term 1960
George Makaravitz - 92 Jan. Term 1961
Charles A. Schwoyer, Admr. - 1 Feb. Term 1961
Julia Savini - 36 Nov. Term 1961
Alfred A. Iezzi - 77 April Term 1962
Helen Weaver - 46 April Term 1969 (summons only)
Fannie B. Cohen - 83 Aug. Term 1965 (summons only)
Lester Matz - 162 Sept. Term 1965
John W. Wentzel - 34 May Term 1966 (See Appendix D-2)
Ruth Bybel, Ind & Gdn - 210 Feb. Term 1968

Tony Elia - 148 April Term 1968 (summons only)
Mary Daniels
Ada Edwards (deceased)
Elsie Peters
Mrs. Roger Gallo (deceased)

If the plaintiffs are successful in the Heck case, it is likely that all or most of these cases will be settled privately without trial. Other claims may be settled without any filing with the court. For this reason and because some claims may never be filed, it should prove extremely difficult to assess the total harm flowing from beryllium pollution in Reading.

APPENDIX E

Opinion of the Court

Phillips v. Elk Paper Mfg. Co., Cir. Ct. Cecil County, Md., Equity No. 1577-B (April 17, 1969)

Fifty-nine Complainants representing one corporation and thirty-one families seek money damages for harm to property and person caused by a nuisance. The Respondent, Elk Paper Manufacturing Company, operated a pulp and paper mill. The nuisance earlier found to exist in fact and permanently enjoined by a decree passed in this case November 15, 1968 was the emission of noxious odors from the mill of the Respondent onto the lands occupied by the Complainants. Counsel for the Respondent agree that the Complainants are to be allowed such money damages as they may properly prove. Give or take a day or two, the nuisance lasted six months ending November 3, 1968 when the mill ceased operating. Counsel for the Respondent agree that damages may be awarded to the date of cessation of the nuisance.

PRINCIPLES OF LAW

Restatement, Torts, Section 929 et seq. has been followed as the correct measure of damages in an analogous case of Superior Construction Company v. Elmo, 204 Md. 1, 12. It reads as follows:

> "Where a person is entitled to judgment for harm to land resulting from a past invasion and not amounting to total destruction in value, the damages include compensation for (a) (permanent damage with which we are not concerned here); (b) loss of use of the land; and (c) discomfort and annoyance in an action brought by the occupant.
>
> "The owner of the subject matter is entitled to recover as damages for the loss of the value of use, at least the rental value of the chattel or land during the period of deprivation. This is true even though the owner in fact has suffered no harm through the deprivation as where he was not using the subject matter at the time or had a substitute which he used without additional expense to him, Section 931, id, comment b."

As for loss of use of land, counsel agree that a fair and acceptable yardstick is the diminution in the fair rental value of the land. As for the discomfort and annoyance to the persons, counsel for the Respondent urges that this overlaps the damages for loss of use of the land. Complainants say not. The authorities divide.

Damage to property alone will not support a recovery for fright occasioned by such damage, State v. Baltimore Transit Co., 197 Md. 528, 82 ALR2d 1062. Damages may be recovered for mental suffering proximately caused by a nuisance, 25 C.J.S. Damages, Section 68 citing Mack v. Hugh W. Comstock Associates, Inc., 37 Cal. Rptr. 466. Wiggins v. Muskins Credit, D.C.S.C. 137 F. Supp. 764 and Acadia v. Herbert, 353 P2d 294 (Calif.). The case of McAlister v. Karl, 233 Md. 446 involved the question of damages for loss of enjoyment. The plaintiff claimed but was not allowed damages for loss of ability to engage in her chosen and intended occupation because she had not entered upon it and her plans were

too unclear and indefinite. The Court reasoned that a damage award would be purely speculative. This reason and because such damages would overlap other elements of damage otherwise compensated for have been the main reasons for Courts denying damages for mental anguish. If the proposition is clear and definite the difficulty of measuring damages for loss of enjoyment in terms of money should not of itself be a bar to the recovery of damages for such loss, McAlister v. Carl, supra. Cases upholding the right to recover for loss of enjoyment usually deal with the capacity to enjoy things which involve matters of common experience with which a jury may be expected to have some familiarity, McAlister v. Carl, supra and citations therein. It is difficult to lay down any hard and fast rule and to draw a clear and sharp line of demarcation between damages which are purely speculative and damages which are capable of some reasonable measurement based upon the common knowledge or experience of, in this case, a judge sitting without a jury. The Court holds in this case, however, that the discomfort and annoyance suffered by the Complainants is susceptible of reasonable measurement except in specific instances hereinafter indicated. And in most cases the damage is separate and distinct. Consider for example in this case Miss Perkins who owns no property yet complains seriously. Is she to be denied damages? We think not. To avoid duplicating damage awards wherever there is, in the opinion of the Court, an obvious overlap of damages for loss of use of land on the one hand and for personal discomfort and annoyance on the other hand this shall be reflected in the amount of that particular award.

The corporate Complainant, Singerly Development Company, engaged in the development of real estate, claims damages because the odor caused loss of sales of unimproved lots. Counsel agree that loss of profit is usually a correct measure of damages in such case provided there is strict proof leaving nothing to conjecture or speculation.

Those entitled to damages shall be limited, at the most, to those persons named in the caption of the Bill of Complaint as the Bill does not purport to be a class action nor to otherwise include members of the family or the household not named in the caption. Persons must be named parties to a suit in order to recover money damages or otherwise complain or obtain other relief.

After stating the facts the Court will apply the foregoing principles of law to the facts.

CERTAIN SPECIFIC SITUATIONS

Before approaching the main task of assessing damages for the majority, those not entitled to damages will be eliminated and certain special situations will be disposed of.

First of all, the Bill of Complaint is to be dismissed as to three couples appearing in the caption under the surnames of Jarvinen, Payne and Harvey because they did not appear to testify nor did anyone appear on their behalf so that the Court has before it no evidence upon which to assess damages. The decree to be passed will so indicate.

Secondly, consider the claim of Singerly Development Company for loss of money due to the noxious odors seriously curtailing the sale of unimproved lots of land at the "Woodland Hills" development one half mile north of the mill and the "Colonial Acres" development one and one half miles south of the mill. The real estate expert, Mr. William F. Burkley, who presented the case for Singerly Development Company is a highly respected real estate broker and appraiser of

17 or 18 years experience with offices in Elkton, Maryland. After deducting the cost of roads in the development, compound interest on money, and promotional costs (including advertising) incurred in the sale of lots Mr. Burkley arrived at the profit per lot sold or to be sold according to these figures and the prospective selling price of each lot. This profit was $1,000.00 per lot. No sales commissions or engineering costs were included. In the 14 month period ending February 1969 eleven lots had been sold. Only one lot was sold during the six months ending October 30, 1968 in which the noxious odors were being emitted. Mr. Burkley stated six lots would normally have been sold in that period at $2,000.00 per lot and that the loss of profit on the five lot sales which were not made would be $5,000.00 and that this sum should be awarded to Singerly Development Company. Mr. McCool, the owner of Singerly Development Company, testified earlier that no sales were made in March or April 1968 which were "odor free" spring months. No reason was given. Nor were the number of sales shown for the comparable period for the previous year, i.e. May-October 1967. There is no evidence in the case, and the Court cannot take judicial notice, as to what time of the year lots normally could be expected to sell. Therefore damages might well be denied entirely as being too speculative. Assuming damages are payable, however, two matters become crystal clear: (1) The corporation has not lost the land but instead sales were merely postponed and, for aught that appears, the lots that were not sold then are being sold now, and (2) the corporation has been denied the use of $10,000.00 for a period of three months (assuming a lot sale in May, June, July, September and October each at $2,000.00). The fairest way to compensate the corporation for loss of use of this money would be to allow a maximum rate of interest. Accordingly, the Court will allow damages and the decree to be passed herein is to include an award to Singerly Development Company in the sum of $200.00 (the interest on $10,000.00 @ 8% for 3 months).

Thirdly, Mr. Burkley has expressed an opinion that as a part of the loss of use of land the fair rental value of an animal hospital has been diminished $390.00 and of a garage $360.00. It seems to the Court that before rental diminution can be allowed for a professional office or a business building at the very least some potential diminution in patients or in business conducted therein would have to be shown. Nothing of the sort has been shown nor has any other reason been given to support a rental value loss. It could be argued that the prolonged obnoxious odors could <u>increase</u> the need for veterinary care. The only evidence on point as to the garage is the affirmative statement of the owner that the odor while bothersome did not decrease the efficiency of the employees. Accordingly, the Court holds that an award would be purely speculative, that the Complainants have not met the burden of proof which is cast upon them in this instance, and no damages shall be allowed for loss of rental value of the hospital or the garage.

Fourthly, when we reach the allowance of damages for loss of use of the land we will find that Mr. Burkley, in an extremely well reasoned presentation of a difficult analysis, after allowing one set of damages for loss of rent based on proximity, adds a second set of damages, "App. Rental Val.Adj." on some of the high priced homes which if followed would increase the rental loss damage award over 50%. The theory, as the Court understands it, is that the tenant who can afford to rent such a home is not going to live in an odor-infested area for any price. There is some doubt that these high priced homes would command the high rentals assigned to them by the expert. He candidly states they were never built to rent. While the Court is going to accept the rentals assigned, to allow other damage than the logical proximity damage (which incidentally is based upon a percentage thereby affording the higher priced homes greater absolute damages) is, in the opinion of the Court, to venture into the forbidden area of excessive speculation.

THE FACTS

Trial has consumed four days during which time the Complainants produced thirty-two and the Respondent twelve witnesses. Naturally there is, in the relating, a wide difference in the effect of the odor upon the Complainants' witnesses as opposed to the Respondent's witnesses. But the Court has no reason to question the credibility of any witness. Indeed, in general, the Court was impressed with the sincerity and honesty and frankness of the witnesses for both sides. The Court believes Mrs. Rachel Racine, a witness for the Respondent, very accurately analyzed the situation when she remarked to the effect that while she had been in no way adversely affected, the odor might bother other people. She equated the odor to a barking dog which bothers some terribly and others not at all. Thus that the witnesses demonstrated a vastly different tolerance, the ability to endure the odor without ill effect although living side by side is not unusual.

A. DISCOMFORT AND ANNOYANCE

The testimony of each of the nineteen couples, the two widows and the one single lady who testified is summarized as follows.

As for the six Complainants living west of the mill:

(1) Miss Esther Perkins who lives with Mrs. Lida Blake smelled a septic odor "to a degree" in May and June and much worse in July, August, September and early October. She went on vacation October 7, 1968 and had no complaint thereafter. She was not at home during the day. She lost sleep, had a nauseated feeling and on five occasions actually lost her breakfast on the way to get the car out of the garage. She testified that the mill odor caused this.

(2) Mrs. Lida Blake, a widow, owns property one half mile away. She testified that she had no property damage. The odor from the mill was present "very often" for the 4 3/4 months from May 15th to October 7th when she went on vacation. It caused a sick feeling, irritated her eyes, nose and throat, caused loss of sleep and on occasion drove her out of the yard into the house. She was home day and night most of the time.

(3) Mr. and Mrs. Racine who live 1/2 mile away noticed the odor an average of four times weekly for six months causing Mr. Racine to have an upset stomach and headache, forcing them to close up the house, and causing loss of sleep. The husband was away during the day. The wife was away Monday and Friday. She was nauseated but stated it may have been due to pregnancy. The house suffered paint damage from the chemicals from the mill and he spent $13 for paint.

(4) Mr. and Mrs. Scott, living 1/4 mile away noticed the odor from the mill for six months, three to four times weekly. The husband was home at night, the wife all the time except they went away camping every Friday, Saturday and Sunday. No ill effects were indicated to the wife except loss of sleep. But the husband had headaches and chest pains 8 to 10 times a month which he attributed to the mill operation. He is 45 and does not smoke. He had no previous history of chest pain (except once eight years ago) and has had none since the mill closed.

(5) Mrs. Bowlsbey, a widow, lives next to the mill and is home all the

time. She stated she had no nausea and no adverse physical effects. But the odor of "beans" was "unbearable." She has had to close her windows. One day a group of church ladies had to leave because of the odor. Some drinking glasses were discolored but there is no evidence as to their value.

(6) Mr. and Mrs. Reynolds live next door to Mrs. Bowlsbey. They both work during the day. A "bad" odor from the mill bothered them three to four times weekly for six months forcing them to give up picnics and barbecues. It did not interfere with sleeping and had no physical effect except once the wife was ill. But it was so annoying that Mr. Reynolds called Mr. Philip Bathon on three successive nights. Glasses were discolored and paint damage occurred at the house but no cost figures are in evidence upon which to base damages.

Pointing up the different effect the odor had on different people is the testimony of the Respondent's witnesses, Mrs. Rachel Racine and Mrs. Coyle, who live in the same area west of the mill and Mr. Marple Lynch who was office manager at the mill. Mrs. Racine has a nice grove where picnics are held and guests congregate regularly. The odor from the mill averaging ten minutes at a time twice weekly did not bother her or her guests. Mrs. Coyle was awakened once by the odor. Aside from this neither she nor her guests (which she had all the time) nor her property (inside or outside) were adversely affected in any way. Mr. Lynch noticed the odor for about ten days in May and on rare occasions later. He was not ill, nauseated nor did his head ache nor did he know of any one at the mill so affected.

As for the seven complaining couples living north and northwest of the mill:

(1) Mr. and Mrs. McMillan live 1/2 mile away where they noticed the odor twice from May 15th to June 8th when Mr. McMillan discontinued a log. During this time he noticed the odor eleven times at different spots while traveling. Mr. McMillan is away during the day. His wife is home all the time. He stated they had a "miserable summer." They lost sleep. Otherwise no adverse physical effects were stated.

(2) Mr. and Mrs. Phillips live 1,000 feet away. He is away during the day. He was one of three persons who kept a log for the whole period. They noted a "fecal" odor on 25 different days (frequently from mid May to the end of June and in September but not at all in July, only twice in August and twice in October). This had no physical effect on the husband but produced "spells of retching" by the wife. But sleep was lost, guests were fewer (part of the family came for a week and left in a day due to the odor). They had to close the doors and windows during the odor periods. Mr. Phillips was not cross-examined.

(3) Mr. and Mrs. Ralph McCool live 1/2 mile away. He is away during the day. He kept a log indicating that on 33 days the odor was bad. She stated that there was some odor three to four times weekly for six months. The anticipation of the odor was as bad on the nerves as its presence. Both suffered headaches and nausea feeling and the wife had spells of sore throat. The odor "caught" in the rugs and furniture. It awoke them many times at night. It drove them out of their yard. It forced them to close the doors and windows of their house. Still the odor came in. They had a special air tight room to which the whole family retreated to sleep on the worst occasions.

(4) Mr. and Mrs. Foster live 1/2 mile away. Both work during the day. The "septic" odor was present two or three times weekly for six months, made her sick twice, irritated them and drove them inside a great number of times. Mrs. Foster was not cross-examined.

(5) Mr. and Mrs. Erickson live 1/2 mile away where the odor was a "nightmare" for six months making it hard to sleep but causing only mental, no physical, suffering. She is home all the time. The status of her husband was not clear. She also complained of noise (not actionable under the pleadings).

(5) Mr. and Mrs. Wiggins suffered no physical effects and no property damage although the odor was present two to three times weekly for six months and awakened them twice. They live in "Woodland Hills" 1/2 mile away.

(7) Mr. and Mrs. Young also live in "Woodland Hills." A "beans" odor three times weekly for six months caused no physical effect upon him but gave the wife headaches every time. She now has headaches once a week. They lost sleep. They had to abandon a cookout three to four times and close the doors and windows.

The Respondent's witnesses in this area were Mrs. Reese, Mr. Given and the three Bathon brothers. Mrs. Reese stated that the mill operation did not affect her, her guests (including up to 15 children that played in the yard all summer), nor her property "in any way, shape or form." The "ammonia odor" from the mill made her sinus condition "feel better." Neither Mr. Given, Mrs. Given nor their guests were bothered at all except for a "very strong odor" for one month in May. Both work during the day. Mr. Philip Bathon stated there was an objectionable odor from the mill but the discomfort and inconvenience were "very slight" and did not at all affect the use of the swimming pool or other outdoor recreation. He had no difficulty renting two apartments all the time. As Superintendent of the Mill, he stated the prolonged odor was an unanticipated problem. Mr. Francis Bathon forthrightly noted that there was a strong odor "likecat dirt" from the mill during May 1968 and on four other occasions. One Saturday afternoon it interfered with the kids' party at the pool for two hours, and one Sunday morning the odor disturbed his sleep. Aside from this he had no problems regarding the use of outdoor recreation facilities including a stable and a pool which were used by hundreds of children. Mr. Daniel Bathon also stated that the odor from the mill was "pretty heavy" during May 1968 and five to six other times causing the children to comment and interfering once with his sleep. But it produced no nausea, headache nor loss of use of property nor did it prevent the entertaining of many guests.

Four Complainants lived at Cherry Hill about 1 1/2 miles east of the mill.

(1) Mr. and Mrs. VanDenHeuvel smelled a "septic" odor two to three times weekly in May for 15 minutes to two hours at a time and with unknown frequency thereafter for six months in all. During the period he was recovering from an accident both were home all the time. They could not enjoy the property outside. They had feelings of nausea. They had no trouble sleeping. A claim for the increased cost of a breezeway is too nebulous to entertain.

(2) Mr. and Mrs. Williams smelled a "rotten egg" odor three to four times weekly for six months which forced them to go inside on occasion. He is not home during the day. They suffered no adverse physical effects. The wife was ill once when the odor was strong but the illness could have resulted from something she ate.

(3) Dr. and Mrs. Manlove smelled an odor "off and on" for six months with frequent odor free intervals of three to four days (apparently an odor about twice a week). This interfered with use of the pool, horses and barbecue and disturbed their sleep many times. The doctor suffered no adverse physical effects. The wife had a nausea feeling and headaches 10 - 12 times.

(4) Mr. and Mrs. Fritz smelled a "burnt potato" odor, for six months three to four times weekly lasting an average of one hour at a time. He is not home during the day. This interfered with cookouts, outdoor games and the garden. The doors and windows of the house had to be closed. The anticipation of the odor was as bad as its presence. Mrs. Fritz stated, "I knew that when the smell came I was going to get a headache." Both had headaches, nausea and were irritable. The wife had chest pains. The husband's asthma was aggravated all due to the mill although he agreed many other things trigger asthma attacks.

Mrs. Lanzi who lived in this same area testified for the Respondent. She stated that for six months they got an "occasional" "offensive" "blast" lasting 10 - 15 minutes which "a couple of times" occurred three to four times weekly. The family would say, "There is the mill again." But outside use of the property including a pool and outdoor cookouts were not affected. Guests came as usual, none staying away nor leaving early due to the odor. No one suffered nausea, headaches nor loss of sleep.

Five Complainants lived 1 1/2 miles south of the mill, all but Mr. McAllister in the "Colonial Acres" development.

(1) Mr. and Mrs. McAllister live on Blue Ball Road where he operates a garage so both were there all the time. For six months three to four times weekly one to six hours at a time they noticed an odor from the mill which was disturbing to work in (although it did not affect work efficiency). It drove the wife inside, gave her a nausea feeling three times and awakened them from their sleep five times. It had no adverse physical effects on the husband

(2) Mr. and Mrs. William McCool kept a log showing 30 days of noxious odor over the six months making each ill once. The odor was irritating. It interfered with cookouts, mowing the lawn, working with fruit trees and entertaining guests. He was not home during the day but was at "Woodland Hills" some time. Mr. McCool was not cross-examined.

(3) Mr. and Mrs. Parrack were "bothered considerably" (by the odor from the mill) in the enjoyment of their garden and flowers two to three times weekly during the six months. It gave the wife three to four headaches. It had no adverse physical effect on the husband. He was not home during the day.

(4) Mr. and Mrs. Howard Slagle smelled a "strong burning" odor for six months three times weekly for three to four hours at a time requiring them to close the doors and windows. He stated the odor had no adverse physical affect on either of them. He was not home during the day.

(5) Mr. and Mrs. Barnett smelled a "septic" odor for six months two to three times weekly "but not every week." It was depressing, irritable, annoying and interfered with their sleep and use of the yard. But he stated it had no adverse physical affect on either of them. He was not home during the day.

Respondent's witnesses living close to this area were Mr. Herron and Mr. Carlisle. Mr. Herron said a "burnt bean" odor once a week had no affect on the health of himself or family nor on the use of his property. Mr. Carlisle testified to the same effect.

B. LOSS OF USE OF LAND.

For loss of use of land the diminution in fair rental value is a correct measurement of damages and the one used by the Complainants in this case. The fact that the Complainants themselves occupied the premises injured by a nuisance maintained by the Respondent does not prevent the lessening of the fair rental value from affording the proper measure of damages, 66 C.J.S. Nuisances, Section 175 and cases cited in Note 89 thereto.

As mentioned earlier, Mr. William F. Burkley was offered as an expert witness on real estate values by the Complainants. He demonstrated a knowledge of the area and the nuisance problem and stated that he had personally visited and appraised twenty-seven (27) properties of the Complainants. This expert stated a separate value for the land and improvements on each property and his opinion of the fair monthly rental value but for the nuisance. All properties, in his opinion, within 1/4 mile of the mill suffered a 75% diminution in rental value, from 1/4 to 1/2 mile 50%, from 1/2 mile to 1 1/4 miles 33% and from 1 1/4 miles to 2 miles 25%. Accordingly, he stated that the fair rental value of the properties of Reynolds and Bowlsbey was decreased 75%, Scott, Racine, Barrow, Blake and Phillips 50%, Foster, McMillan, R. McCool, McAllister, Herron (2 properties), VanDenHeuvel, Simpson, Wiggins, Young and Howell 33%, and Fritz, Collins, Manlove, Williams, Parrack, H. Slagle, A. Slagle, Barnett and W. McCool 25%. On this basis he gave a damage figure for each property for six months from May 1968 through October 1968. (The expert's "App. Rental Val. Adj." which would have increased the damage to some of the higher priced homes we disregard as being too speculative and uncertain of measurement).

Cross-examination developed that the expert had no actual sales in the precise area for comparison although he presented comparable sales in nearby areas. Also, the expert had not used actual cost figures to aid in his appraisal although a number of the homes in question had been built very recently. Nor could the expert show any actual cases of rental loss. Therefore the Respondent contends that at least the Scott, Herron and Collins properties, since they had rental units actually rented, were damaged by the expert in error.

As for rentals, Mr. Philip Bathon stated he had no difficulty during any of the period in renting a two bedroom second floor apartment for $75.00 monthly nor a four bedroom first floor apartment for $100.00 a month. These apartments were in an area where, according to the expert, rental value had been diminished 33% due to the odor. Mr. Howard Tome testified that a two bedroom house, where Mr. Burkley estimated rental value to be down 50%, actually rented for $100.00 a month on July 27, 1968. Mr. Tome described this house and the exterior of five other houses (he had been inside none of these) upon which Mr. Burkley had placed a fair monthly rental value of $95.00 (Scott), $100.00 (Barrow), $90.00 (Reynolds), $60.00 (Bowlsbey) and $110.00 (Racine). Mr. Tome's descriptions suggested the house rented in July might command a higher rental than the others. Mr. Burkley's figures neither seriously dispute nor affirm this suggestion. Mr. Tome was not allowed to go further on comparisons because although he testified he was a realtor and developer of many years experience, Respondent consciously avoided qualifying him as an expert witness.

Thus, the only expert witness to testify as to diminution in fair rental value was Mr. Burkley. His testimony was not seriously impaired by cross-examination. For example, he offered acceptable comparable sales even if not in the precise two mile circle. Actual cost figures on recently built homes might have been helpful but they were not imperative data in the formulation of the opinion of the expert. Moreover, they were discoverable and thus available to the Respondent if it desired to offer actual cost figures. Nor need he show actual loss of rent in order to produce a figure on diminution of fair rental value. We have already cited authority that the land or improvements need not be rented at all, 66 C.J.S. Nuisances, Section 175 and cases cited in Note 89 thereto. It is the right to use the land that is compensable and the law provides diminution in fair rental value as the yardstick without regard to whether or not actually rented, Restatement Torts, Section 931, comment b. Thus, it is clear that the fact that a neighbor may have actually rented his property will not, standing alone, affect the right to recovery.

Applying the above rules it can be seen that practically the only evidence before the Court on loss of use of land is that of the expert witness Burkley. His testimony is not seriously challenged. His testimony is bottomed upon substantial and logical reasons. The Court does not perceive as either its duty or within its capability, in deciding this case, to unilaterally conclude that Mr. Burkley's figures are other than fair and reasonable especially where his testimony and expert opinions stand expressed without substantial challenge or dispute.

THE DAMAGES

A. DAMAGES FOR LOSS OF USE OF THE LAND

For the reasons given above the Court will accept Mr. Burkley's figures for damage to loss of use of land except as previously rejected in this opinion in "Certain Specific Situations," supra. The decree to be drafted by counsel shall reflect those figures.

B. DAMAGES FOR DISCOMFORT AND ANNOYANCE

Trite it is to mention that the most difficult task confronting the Court is the assessment of damages for discomfort and annoyance that are fair and reasonable to both the Respondent and each Complainant. The occasion for awards of this type in courts of equity is certainly infrequent. There is little to serve as a guide. Certain it is that there will be those who will disagree with the sums the Court is about to award. Counsel for both sides during closing argument were cited specific factual instances and not only invited but urged to place a dollars and cents valuation upon the damages suffered by that property owner. Counsel for both sides respectfully refused to do so. Their refusal underscores the difficulty.

Of course the purpose of money damages is not to punish the Elk Paper Manufacturing Company. There is not the slightest suggestion of malice or wilfulness or intentional harm to these Complainants. The mill was a lawful operation. Processes were commenced to keep up with competitive mills. They were commenced after several years experimentation and investigation as to feasibility. Unanticipated problems arose and the odor could not be controlled despite the expenditure of large sums and desperate efforts to do so. This does not make the result any less a damage producing nuisance. A wholly lawful operation may be a nuisance. But it certainly negates any thought of punitive damages. It has

been held that damages might be increased--without being punitive--because of improper motive on the part of the Respondent. By the same token, damages may be lessened by the showing of a wholly proper motive on the part of the Respondent.

The purpose of money damages is to make each Complainant whole <u>according to the evidence he has presented</u> as to harm caused by the Respondent. As Mrs. Racine testified the odor obviously bothers some more than others. As eleven witnesses testifying for the Respondent indicated the odor obviously bothers some not at all. This same differential threads its way through the testimony of the Complainants. People living in the same locale are affected differently. In some cases husbands are physically affected and wives are not. In others the reverse is true. The odor disturbed the sleep of most but two couples testified affirmatively that it did not disturb their sleep and one couple was disturbed only twice. Most husbands and some others worked away during the day reducing their exposure time by at least one-third. In other cases both spouses were home all day. These and other distinguishing facts related by the testimony of the different Complainants must be considered. There will be, as a result, different damage awards for people living in essentially the same place. Of course, there will be, generally speaking, higher damage awards for those living closest to the mill and lower awards for those living the greatest distance (much the same as the proximity factor used by Mr. Burkley). As stated earlier, where an overlap is apparent between damages for lost land use and for discomfort, the damages for discomfort will be reduced.

With the foregoing in mind and without further discussion the Court makes the following damage awards for discomfort and annoyance which shall be shown in the decree to be prepared as in addition to the awards for loss of use of the land. Only the surname is used in this opinion for the sake of brevity but the full names shall appear in the decree.

Perkins (single)	$200.00
Blake (widow)	150.00
Racine	413.00
Scott	450.00
Bowlsbey (widow)	200.00
Reynolds	300.00
McMillan	300.00
Phillips	400.00
R. McCool	450.00
Foster	350.00
Erickson	250.00
Wiggins	250.00
Young	350.00
Van Den Heuvel	300.00
Williams	250.00
Manlove	350.00
Fritz	450.00
McAllister	350.00
W. McCool	350.00
Parrack	250.00
H. Slagle	250.00
Barnett	250.00

Costs are to be paid by the Respondent.

Upon presentation by counsel, the Court will pass a decree in accordance with this opinion.

* * * *

The following sets forth the damage awards in the case:

TOTAL DAMAGES

	Loss of Profits	Loss of Use	Discomfort etc.	TOTAL
Perkins			$ 200.00	$ 200.00
Blake		$ 450.00	150.00	600.00
Racine		330.00	413.00	743.00
Scott		450.00	450.00	900.00
Bowlsbey		270.00	200.00	470.00
Reynolds		390.00	300.00	690.00
Barrow		300.00		300.00
Simpson		300.00		300.00
Howell		510.00		510.00
McMillan		300.00	300.00	600.00
Phillips		600.00	400.00	1000.00
R. McCool		360.00	450.00	810.00
Foster		300.00	350.00	650.00
Erickson			250.00	250.00
Wiggins		510.00	250.00	760.00
Young		570.00	350.00	920.00
Van Den Heuvel		300.00	300.00	600.00
Williams		570.00	250.00	820.00
Manlove		450.00	350.00	800.00
Fritz		270.00	450.00	720.00
Collins		450.00		450.00
McAllister		240.00	350.00	590.00
W. McCool		750.00	350.00	1100.00
Parrack		450.00	250.00	700.00
H. Slagle		540.00	250.00	790.00
Barnett		540.00	250.00	790.00
A. Slagle		570.00		570.00
Herron		870.00		870.00
Singerly Development Co.	$200.00			200.00
	$200.00	$11640.00	$6863.00	$18703.00

* * * *

Table E-1 attached is a copy of the expert witness's summary of his testimony.

TABLE E-1

Summary of expert witness's appraisals in Phillips v. Elk Paper Mfg. Co.

NAME	LAND	BEFORE IMP.	TOTAL	%	MONTHLY RENTALS	DIST. ADJ. DAMAGE	APP. RENTAL VAL. ADJ.	ADJ. RENTAL VALUE	MONTHLY DAMAGE TOTAL	TOTAL DAMAGE 6 MON.
Reynolds	1,000.	10,612.	11,612.	75-A	90.	65	---	25	65	390
Bowlsbey	2,000.	5,952.	7,952.	75-A	60.	45	---	15	45	270
Scott	6,000.	11,848.	17,848.	50-B	150.	75	---	75	75	450
Racine	900.	9,000.	9,900.	50-B	110.	55	---	55	55	330
Barrow	900.	8,750.	9,650	50-B	100	50	---	50	50	300
Blake	3,000.	12,890.	15,890	50-B	150.	75	---	75	75	450
Phillips	8,100.	22,019.	30,119.	50-B	200.	100	---	100	100	600
Foster	1,500.	15,702.	17,202.	33-C	150.	50	25	75	75	450
McMillan	1,500.	20,536.	22,036.	33-C	150.	50	---	100	50	300
R. McCool	2,000.	24,000.	26,000.	33-C	175.	60	15	100	75	450
McAllister D.	1,500.	13,624.	15,124.	33-C	125.	40	---	85	40	240
G.	3,000.	14,400.	17,440.	33-C	175.	60	---	115	60	360
Herron #1	1,125.	17,400.	18,525.	33-C	175.	60	---	115	60	360
#2	1,875.	19,533.	21,408.	33-C	250.	85	---	165	85	510
Van Den Heuval	2,200.	15,650.	17,850.	33-C	150.	50	---	100	50	300
Simpson	1,650.	13,350.	15,000.	33-C	150.	50	15	85	65	390
Wiggins	2,500.	25,840.	28,340.	33-C	250.	85	35	130	120	720
Young	3,000.	31,000.	34,000.	33-C	275.	95	40	140	135	810
Howell	14,125.	33,046.	47,171.	33-C	250.	85	[illegible]	150	100	600
Fritz	1,575.	17,400.	18,975.	25-D	175.	45	---	130	45	270
Collins	7.200.	34,551.	41,751.	25-D	300.	75	---	225	75	450
Manlove D.	11,500.	29,465.	40,965.	25-D	300.	75	25	200	100	600
H.	5,755.	19,640.	25,395.	25-D	250.	65	---	185	65	390
Williams	14,400.	34,600.	49,000.	25-D	375	95	30	250	125	750
Parrack	4,000.	30,918.	34,918.	25-D	300.	75	50	175	125	750
H. Slagle	6,500.	37,600.	44,100.	25-D	350.	90	60	200	150	900
Barnett	6,000.	40,340.	46,340.	25-D	350.	90	60	200	150	900
A. Slagle	10,000.	41,530.	51,530.	25-D	375.	95	70	210	165	990
W. McCool	18,400.	70,749.	89,149.	25-D	500.	125	125	250	250	1500
Singerly Dev.	98,908.	---	98,908.	---	---	---	---	---	---	5000
TOTALS	242,113.	681,945.	924,098.		6,410.	2,065.	565.	3,780.	2,630.	20,780.